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A N

E S S A Y

O N T H E

*MATERIA MEDICA.*





A N  
E S S A Y  
O N T H E  
M A T E R I A M E D I C A .

I N W H I C H  
The Theories of the late D R . C U L L E N  
are confidered ;

T O G E T H E R W I T H

Some Opinions of M R . H U N T E R , and other  
celebrated Writers.

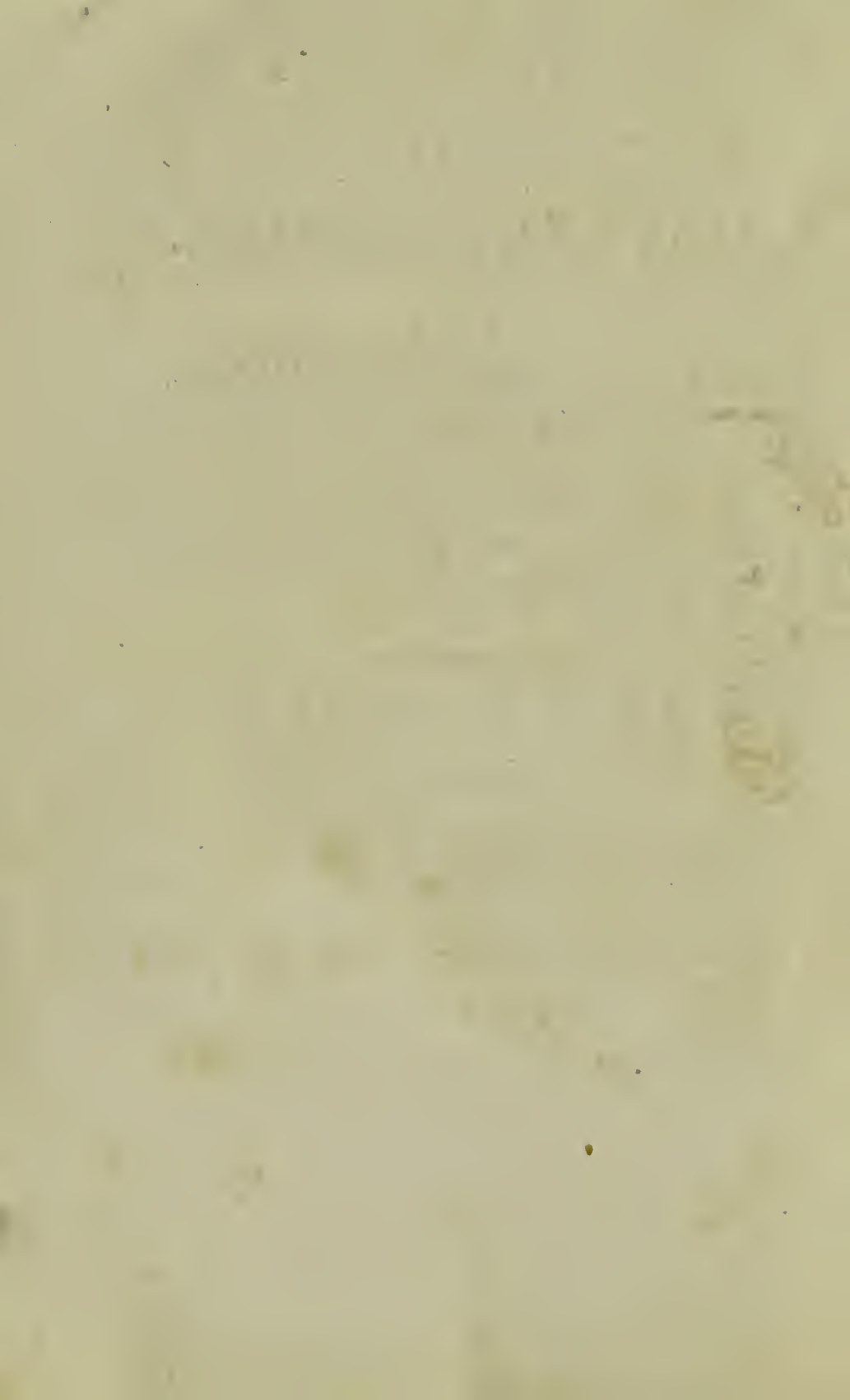
By J A M E S M O O R E ,  
M E M B E R O F T H E S U R G E O N S C O M P A N Y .

Inventore minor : neque ego illi detrahere aufim  
Hærentem capiti multa cum laude coronam. H O R .

L O N D O N :

P R I N T E D F O R T . C A D E L L I N T H E S T R A N D .

M D C C X C I I .



T O  
M A T H E W B A I L L I E,  
M. D. F. R. S.  
PHYSICIAN TO ST. GEORGE'S HOSPITAL,  
AND LECTURER OF ANATOMY,  
IN LONDON.

DEAR SIR,

A LITERARY work, instead of being offered as an homage to men of rank or fortune, unacquainted perhaps with the subject of which it treats, appears with more propriety, in my opinion, as a testimony of friendship, particularly when addressed to a consummate judge of the merit or demerit of the performance.

Influenced by these sentiments,  
I address this Essay to you ; and, I  
am with much esteem,

Your sincere Friend,

JAMES MOORE.

GROSVENOR STREET,

MAY 26, 1792.

T H E

# P R E F A C E.

**T**HIS treatise was begun, and it was hoped would have been published during the life-time of DR. CULLEN; who was of a disposition to have viewed with pleasure every candid examination of his works.

This celebrated Physician was one of those extraordinary characters, who are formed for the advancement of science.

The turn of his mind was peculiarly adapted to the investigation of Me-

dicine. He had a clear and penetrating understanding; and possessed in an eminent degree that sagacity and caution, which are so necessary in examining and judging medical subjects.

In consequence of his distinguished talents, DR. CULLEN acquired at an early period of life the rank of Professor; and was engaged for upwards of fifty years, in practising and teaching the science of medicine.

The greatest part of that time was spent in a large and populous city, where he lived in continual intercourse with men of enlightened minds, and well acquainted with every branch of knowledge.

By

By his uncommon genius and industry, he gained a superiority over all competitors for medical fame ; no easy victory, in a country whose natives are distinguished for activity of competition. But this superiority was not confined to Scotland.

His works were translated and spread over the continent ; and he enjoyed for many years the reputation of the First Medical Teacher in Europe.

His *Materia Medica* is written entirely upon a new plan.

The sensible properties and natural history of every medicine, together with their chemical and pharmaceutical treatment, have been accurately explained by other writers.

He

He therefore thought it unnecessary to insist upon these circumstances. But he attempts what is far more difficult, namely, to explain the principles on which medicines produce their effects upon the living body.

This subject is extremely important: for the true knowledge of it must tend to fix the practice of medicine and surgery upon a more solid and rational basis. And although it is likewise the most philosophic branch of the *Materia Medica*, yet it has been the least cultivated; which renders DR. CULLEN'S work the more original.

This



This Author, in his writings, has distinguished himself by a total disregard of authorities, however high, when contradicted by reason or experience.

He has attacked the system, and exposed the errors of some of his more immediate predecessors with equal success and ingenuity.

It is in a great measure owing to him, that many of the opinions of Boerhaave have been set aside, particularly his doctrine of Lensor.

The freedom which DR. CULLEN took in scrutinising the works of others, and which is so necessary for the advancement of science, he must  
naturally

naturally have expected would be taken with his own opinions.

It ought not therefore to appear presumptuous or unbecoming, to point out what seems to be erroneous in the writings of any author, how greatly soever celebrated: indeed, the propriety is greater in proportion to the celebrity of the author; for the mistakes of a writer of little fame are of little importance.

Although the following work is chiefly intended as an examination of DR. CULLEN'S Treatise on the Materia Medica; yet the author does not entirely confine himself to it.

The opinions of several other celebrated writers are likewise taken notice

tice of, and occasional observations are made upon the theory and practice of Medicine and Surgery, when they are naturally suggested by the subject.



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The Reader is desired to correct with his Pen the following

E R R A T A.

- Page 42, line 16, *for* vegetable, *read* coagulable.  
46, — 18, *for* formation, *read* fermentation.  
64, — 6, *for* vegetables, *read* vegetable.  
184, — 10, *for* renews, *read* removes.

A N

E S S A Y

ON THE

MATERIA MEDICA,

&c. &c.

**D**R. CULLEN has prefixed to his treatise on the Materia Medica, an excellent history of that science, interspersed with judicious criticisms upon the works of the most celebrated writers on the subject. And as he intends to establish his own opinions in the most fundamental manner, he begins his treatise with observations on the action of medicines upon the body in general. Finding that they operate differently upon men of different Temperaments, he proceeds to treat of the nature and causes of Temperaments.

Upon this section, I shall take the liberty of making some remarks.

B

OF

## OF TEMPERAMENTS.

**I**N different ages, a variety of theories have been invented, to explain the cause of the differences of Temperaments in men.

These theories have been admired, adopted for a time, and successively exploded.

Dr. Cullen has thought proper to give a new theory of this subject, which, however ingenious, I suspect will have the same fate as the others.

He has made an apology for his manner of considering the subject. For, instead of distinguishing Temperaments by external and obvious circumstances, he has done it by those circumstances of the internal state of the human body, which he imagines are the causes of the difference.

A method, however, liable to this objection; that it is extremely difficult to discover causes, and to prove them in a convincing manner :



manner : whereas the other mode of distinguishing Temperaments by external marks, and by the disposition of the mind, is more simple, and less liable to error.

This method probably appeared most attractive to the Doctor, because it is easier and more agreeable for a man of ingenuity to speculate, than to follow the tedious and vulgar road of observation, which is open to every drudge in science.

I shall give a brief sketch of his theory.

He refers the circumstances which occasion different Temperaments to five heads:

1st, To the state of the simple solids.

2dly, To the state of the fluids.

3dly, To the proportion of solids and fluids in the body.

4thly, To the distribution of fluids ; and,

5thly, To the state of the nervous powers.

He then remarks upon each of these heads.

Of the first, it is said, that the greater or less density and elasticity of the simple solids, has a great share in distinguishing the different Temperaments.

Of the second, or the state of fluids : The blood is the only fluid which Dr. Cullen takes notice of, and certainly it is by far the most important. He observes that it is composed chiefly of three heterogeneous parts, the red globules, gluten, and serum. And as it is probable that in the blood of different persons, these substances are in different proportions, they may occasion some difference in the Temperaments. It is hinted likewise, that some effect may possibly be produced by the serum being more or less saline or acrid. But he raises many objections to these opinions ; and, upon the whole, he observes, “ That there is little ground for distinguishing the different Temperaments of men “ by the different state of their mass of  
“ blood :”

“ blood :” and he likewise says, in another place, “ That the state of the fluids depends  
“ very much upon other circumstances of the  
“ constitution, which are more fundamental  
“ and powerful in determining the several  
“ conditions of it.”

The third and fourth articles, he supposes, are of slight importance in distinguishing Temperaments; but that which is of the greatest, is the fifth article, or the state of the nervous powers.

Concerning the manner in which the nerves perform their office, he has adopted the common opinion of a nervous fluid; and has bestowed upon this imaginary fluid such qualities as seem best adapted to his general doctrine of Temperaments. Upon this important part he has enlarged exceedingly, and laboured to establish a complicated theory.

The different states of the nervous system he refers to three heads: its sensibility, irritability, and strength.

He supposes that sensibility is occasioned by impulses made on the extremities of the nerves, and occasioning an oscillatory motion in the nervous fluid, which is propagated to the brain; and that irritability, or the contraction of the muscular fibres, is occasioned by the energy of the brain, impelling the nervous fluid into the muscles.

He supposes also, that in different persons this fluid is of different degrees of density and elasticity; and that these different states occasion different degrees of sensibility and irritability. That where the nervous fluid is uncommonly dense, as the oscillatory movements will be propagated less quickly, sensibility and irritability will be less; and, on the contrary, that they are very great in those persons in whom this fluid is uncommonly subtle and elastic. The same agent is therefore appropriated to both of those qualities.

But

But the Doctor confesses, that to this there is a strong objection, viz. That the two qualities do not follow the same laws. For it is observed, that a repetition of the same sensations decrease sensibility ; whereas a repetition of the same motions increases irritability.

It is likewise found, that these qualities are sometimes in different degrees in the same person. It becomes therefore requisite to give some explanation of these circumstances, which are evidently inconsistent with the theory. This he does, by asserting that irritability is not owing wholly to the state of the nervous fluid ; but partly to the greater or less degree of tension of the nerves themselves.

He thinks that there is a vast number of blood vessels intermixed with, and running across the moving fibres, for the purpose of giving them heat and tension ; and that a great degree of fulness in those vessels



may give a state of tension to the nerves, and consequently an increased irritability, independent of the state of sensibility.

Under the third head, he considers the strength of the nervous system, upon which, according to him, the strength of the body always depends; for the strength of the body appears to consist in the force of the contraction of the muscular fibres, which, in the living body, are possessed of a *vis insita*, occasioning a continual tendency to contract.

He thinks it probable, that this depends upon the muscular fibres being fitted to receive a large portion of the nervous fluid, which, being elastic, must have a continual tendency to contract itself, and in the same instant contract the fibre in which it is contained; and that the force of this contraction, probably, is in proportion to the density of the fluid,

It

It is no small objection to this theory, that it requires our faith to a variety of unproved and improbable suppositions.

Another circumstance against it, is its intricacy ; which is contrary to the usual simplicity of nature.

But, independent of those presumptions, some proof of a positive nature may be brought against it. For it is to be remembered, that sensibility and irritability follow different laws, and are sometimes in different degrees in the same person. Whereas, if the same agent produced both these effects, they ought to follow the same laws, and would always be in the same degree in the same person.

The Doctor indeed attempts to remove this objection, by observing, That an increased irritability may be owing, in some cases, to a tension of the moving fibres, produced by plethora. But this explanation is by no means satisfactory. For where there is a  
plethoric

plethoric habit, it is universal all over the body, and not confined to the muscular fibres.

This state therefore ought to augment the sensibility, as well as irritability, so that both would still exist in the same proportion to each other.

The insufficiency of Dr. Cullen's explanation is still more evinced by this fact, that irritability is almost always found in debilitated and emaciated habits, which are the reverse of plethoric. For this state is apt to produce dulness and inactivity, rather than irritability.

The Doctor's conjecture concerning the cause of muscular motion, is even more objectionable. For after admitting the existence of the invisible nervous fluid which is assumed; and after endowing it with elasticity, density, and all the other properties demanded, it still remains unaccounted for how this fluid can contract.

The



The elastic power indeed, so far from accounting for contraction, would have formed a much more natural reason for the fluids extending or dilating.

But even if we admit, in spite of all that can be urged, that the nervous fluid may somehow or other contract; how shall we account for this subtlest of all fluids being able to drag the muscular fibre with such force, as is exerted in muscular contractions?

What example of a similar nature can be given; and by what analogy can we think it probable, that the contraction of a fluid can contract at the same time the solids which contain it?

Such are the objections which occur to me against Dr. Cullen's theory of the nervous and muscular systems. Sensible at the same time, that it is infinitely more difficult to explain the secret springs and principles of this very curious part of the animal œconomy,

œconomy, than to make plausible objections to the most ingenious theory. Men of the first rate genius have failed in the first, while others of ordinary capacities have been successful in the second.

I have now taken notice of the five circumstances on which Dr. Cullen thinks the difference of Temperaments depends. And although I have presumed to think his theory in some particulars erroneous; yet I do not mean to assert, that all these circumstances may not contribute to form a difference in the Temperaments.

For whether all the above mentioned causes are united in the production of Temperaments, or one of them only; or whether there is some undiscovered agent more powerful than any hitherto named, seems to me quite uncertain.

If we were allowed to indulge in conjecture, many other causes might be enumerated,

rated, as occasioning the differences of Temperaments, on as good grounds as the above.

For example, Dr. Cullen supposes, that the different degrees of density of the solids and fluids occasion a difference of Temperaments ; but is it not likewise possible, that a difference may be occasioned by the various proportions of the constituent parts of the solids or fluids ; and, among the infinite variety which exists in the organization of the human body, why may not a difference in this, produce some difference of Temperament ?

But what I confess surprises me more than any other circumstance is, to find that the Doctor does not mention the influence of the mind upon the body, as contributing at all to the production of Temperaments.

Dr. Cullen, so far from mentioning it as a cause, expressly says, “ It is seldom  
“ that the difference of the intellectual power

“ gives such a difference of Temperament,  
“ as may particularly affect the physical  
“ state of the human body \*.”

For my own part, I cannot help thinking, that the influence of the mind upon the body operates considerably in the formation of Temperaments.

Even those who deny the existence of a soul, or mind, as distinct from the body, and who imagine that the soul is nothing more than a modification of matter, must acknowledge, that the modification which occasions different characters and passions, causes very different actions and effects in the body. And since the mind, of whatever nature it is, occasions such changes of the body; why is it asserted, that it produces none in the Temperament, or nature of the constitution?

It must be owned, that this seems extremely improbable.

\* Cullen's *Materia Medica*, vol. i. p. 103.

But,

But, after all, we are still so ignorant upon the whole of this subject, that perhaps we ought not to pretend to assign the causes of Temperaments.

Those circumstances, which are named *causes*, ought rather to be termed *marks* of the different Temperaments. For whether they are causes, or only accompaniments of the Temperaments, seems perfectly uncertain.

After explaining his general theory, Dr. Cullen then applies it to particular Temperaments. But, in doing this, he has not entirely avoided a practice too common among the inventors of systems, of bending circumstances from their natural direction, in order to support the fabric they are raising.

The Doctor seems to imagine, that all Temperaments may in a great measure be reduced to these two principal ones; the melancholic, and the sanguine;—which he describes



describes as opposite to each other in every particular.

He observes, that in the sanguine Temperament, the solids are lax ; that the blood abounds with serum and red globules ; and that the proportional quantity of blood in the arteries is greater than in the veins ; that the proportion of fluids is greater in this Temperament, than in the melancholic ; and lastly, that the nervous fluid is more subtle and elastic, consequently causes a great degree of sensibility and irritability, and is at the same time more changeable.

The melancholic Temperament is in every particular the reverse ; and this happens, in Dr. Cullen's opinion, from an opposite state of those five circumstances, which he enumerates as the sole causes of Temperaments.

For, in the melancholic Temperament,

1st, Instead of being lax, the solids are firm and dense.

2dly, Instead of serum and red globules, the blood abounds with gluten.

3dly,

3dly, The proportion of blood is larger in the veins, than in the arteries.

4thly, The proportion of solids is greater than in the sanguine.

5thly, The nervous fluid is not so subtle, but more dense; occasioning less sensibility and irritability, and forming a more firm and steady character.

The Doctor likewise thinks, that young people are in general most apt to be of the sanguine Temperament; and, as they advance in life, the five foregoing causes gradually operating, the constitution becomes more melancholic.

He proceeds to observe, that as the causes of the melancholic Temperament are most prevalent in the male sex, and those of the sanguine in the female, the two sexes of course are distinguished by tendencies to those opposite Temperaments.

The choleric and phlegmatic Temperaments, which have been very generally described

c

scribed by his predecessors, Dr. Cullen conceives to be nothing more than imperfect formations of the sanguine and melancholic.

He thinks that a certain mixture of the five causes, in which there is more strength than in the sanguine, and more irritability than in the melancholic, produces the choleric Temperament; and that another combination, in which there is less sensibility and irritability, but more strength and steadiness than in the sanguine, forms the phlegmatic.

Such is the account given by Dr. Cullen; and although nobody could peruse his works with a stronger bias in his favour, or more disposed to adopt his opinion, than myself, I must confess, that his reasoning has failed in carrying conviction to my mind. And, I am much deceived, if in many particulars, the Doctor's account of  
Tempera-



Temperaments is not contrary to what is to be observed in nature.

It appears to me, that the choleric and phlegmatic Temperaments are by no means formed of mixtures of the others, but are distinct and unconnected; and the sanguineous and melancholic are as little dependent upon age or sex. So far from the sanguineous being the Temperament of youth, and the melancholic of old age, my observation leads me to think, that all the various Temperaments may be discovered in children at as early a period as distinct characters can be discovered; and that instead of changing to their opposites as life advances, it usually happens that the Temperament which was observed in infancy, increases with strength, and is confirmed by years.

I am led also to believe, that all the Temperaments are to be found in both the sexes; and that the principal difference is,

that in women they are not so strongly marked, as in men.

Having said thus much, it becomes in some measure incumbent on me to give my own notions, however crude, on the subject of Temperaments. And being conscious that my opinion is no authority, I only expect it will make impression in proportion as my reasoning conveys conviction.

The particular mental qualities of an individual, form, and are named, his character; and his bodily qualities constitute his Temperament. And as a conjunction has been usually observed between the Temperament and the character, it has been as common among physiologists in their description of Temperaments, to mention the corresponding character, as it is among poets and moral writers to bestow upon their principal characters a figure and countenance analogous to their disposition of mind.

This

This connection between the mental and the corporal qualities, though strongly insisted upon by some writers, has been as strongly denied by others; who have ridiculed the idea of there being any connection between the colour and form of the body, and the qualities of the mind.

This question has been frequently agitated, and it includes another; namely, whether the art of physiognomy is, or is not, to be depended upon? Those who deny that there is any connection in nature between the corporal and mental qualities, assert that they have frequently seen persons whose external appearance indicated one Temperament, but whose cast of mind was expressive of another; and that they have likewise observed extremely vicious dispositions in persons whose countenances were expressive of benevolence.

But particular exceptions do not overturn the justness of a general rule; if they

did, almost all general rules would be overturned.

There is certainly an intimate connection between heat and sun-shine, but yet it is sometimes pretty cold when the sun is shining.

Before we allow, therefore, the exceptions to alter our faith, we must consider whether they cannot be accounted for, consistent with our belief in the general rule.

My own observations incline me to join in opinion with those who think that a particular form and appearance of body and countenance, is a strong indication of a particular character. And I adhere to this notion with the more confidence, that it has been entertained by men of great acuteness and penetration in all ages and countries.

It is very evident, that mankind have an idea of a benevolent countenance. For although some persons assert, that this species of countenance often belongs to a bad man, still this is admitting that there is a certain  
form

form of features which gives to the countenance a character of benevolence.

Whenever the character is strong, the whole world are of the same opinion. No one ever mistook the benign countenance which Raphaël has given to our Saviour, as the portrait of a malevolent man ; nor could any one conceive that the features which Guido bestows upon Satan, indicate good will to the human race.

But when the character of the countenance is weak, or of a mixed nature, men sometimes differ in their opinions, just as they differ upon other impressions of the senses, or even upon moral subjects. For there is no absolute agreement among mankind, respecting what is most pleasant to the organs of smelling and taste, no universal accord as to beauty or deformity ; and in certain particulars, there is even a difference in opinion with regard to virtue and vice.



But although individuals differ in some few instances, and in certain shades, in those points ; it cannot be denied, that in general mankind are of the same opinion upon all those subjects. That they in general like and dislike the same scents and tastes, that they usually agree in their opinions concerning the beauty and deformity of objects ; and that, in most instances, they have the same ideas of what actions are right and wrong.

If the truth of physiognomy, therefore, is liable to no other objection, than what may be, with equal justice, urged against our impressions and ideas on those other subjects, I imagine it stands upon pretty solid grounds.

Indeed, it is so natural for us to judge of the characters of those men whom we see for the first time by their appearance, that it is hardly in our power to avoid it. And the opinion which is taken up in so natural  
a way

a way must, in most instances, be well founded. For it cannot be imagined, that God would give us senses liable generally to error, and form our sight, in particular, in such a manner, that we should look with hatred upon a good, and with esteem upon a wicked man. Whereas, that our impressions in general convey just ideas, is an instance of the wisdom of nature, in enabling us frequently to judge by outward signs even of the invisible mind.

This is similar to that instinctive perception in animals, by which, at one glance, they discover their foes. When a horse is brought, even for the first time, into the presence of a lion, he is instantly seized with the utmost horror.

Instinct is weaker in the human race, but it is not altogether wanting. For, it is not in consequence of reasoning and experience solely, that we are enabled to judge of character from looks. Our powers of judging  
are,

are, without doubt, improved by experience, and strengthened by analogy and comparison in our intercourses with men and animals ; yet the original faculty seems to be a kind of instinct.

It would seem, that our brain and nerves are so constituted, as to receive impressions corresponding to the appearance of animals ; and that the appearances of animals are analogous to their dispositions or characters.

The countenance of the tiger denotes ferocity ; that of the hare, timidity. It is not, that there is any connection like cause and effect between the external figure and character, but there seems to be always a conjunction of a particular kind of appearance with a particular character.

It is like the union of light and heat. Light probably is neither the cause nor the effect of heat, but they are very commonly united together.

The



The characters of the brute creation are simple, and strongly marked ; and the differences among the individuals of the same kind are few. But man is the most complex of all animals : he possesses in some degree the virtues and vices of every species. The minds of men are extremely different from each other, *quantum differt homo homini !* The capacity of one man is almost as superior to that of others, as that of the latter is superior to the intelligence of some brutes.

In like manner, there is a prodigious difference in the character of the face of different men. But the characters of many individuals being mixed and complicated, occasions the more difficulty in discovering them.

What renders our judging of characters by the countenance more fallible than it otherwise would be, are the changes produced by education. But, in this term, I include

clude not only the instruction which is given, and the examples which are presented from childhood upwards, but the diet, dress, and every circumstance in the mode of life. Improper regimen, want of exercise, or some accidental distemper, will change the most robust and vigorous constitution to a weak and delicate one: and vicious examples, and temptations, with the power of gratifying every appetite, and indulging every caprice, will change a disinterested, benevolent, mild disposition, into a selfish, harsh, and wicked one. From which it often happens, that the best physiognomists form wrong judgments.

When a young man, naturally of a good disposition, has it changed into a bad one, by the influence of the causes above mentioned, he will still retain many of the marks of his original good character. On the contrary, if a bad man is corrected by examples of goodness, by sentiments of religion

religion or philosophy, his features will still retain most of the marks of his first vicious character.

This was the source of the error of that physiognomist, who saw indications of lewdness in the modest Socrates.

Education has not only the power of changing the disposition, but likewise the capacities of the minds of men. A man naturally of slow parts may, by dint of application and study, render himself superior in his intellectual powers to those of brighter parts, which they neglected to cultivate. Nice observers have even remarked, that men of every trade and profession have a peculiar stile of countenance. On the whole, I am of opinion, that we are born with an assortment of features expressive of our original characters; and that, if our character is changed by the various incidents of life, some change likewise takes place in the expression of the countenance.

This

This is owing to the passions and turn of mind imprinting a lasting impression on the features.

An excellent physiognomist might, perhaps, by studying countenances with great attention, be able to discriminate between the original and acquired expression. But men, generally, through life, follow the natural bent of their inclinations, and seldom change in any considerable degree. Whatever attempts are made to disguise, conceal, or alter the disposition; that which is originally stamped by the hand of Nature, generally remains and baffles all art, leaving the countenance a pretty good index of the real turn of the mind.

Those observations have led me to imagine, that the art of physiognomy is not a chimæra formed in the imaginations of fanciful men; but that it has a real foundation in nature. And, if what has been  
said

said is allowed to have any degree of justness with regard to physiognomy, it will have more force when applied to prove the truth of the doctrine of Temperaments.

It was formerly observed, that there are generally reckoned four. The sanguineous, the melancholic, the choleric, and the phlegmatic. This division is as old as the days of Hippocrates. Perhaps several other peculiarities of constitution might likewise be described as Temperaments, but it would be of more use to describe these four more accurately than has hitherto been done, than to add to the number.

The sanguineous Temperament is accompanied with a gay cheerful turn of mind.

The melancholic by the very opposite.

The choleric Temperament is attended with an irascible, the phlegmatic with a calm disposition.



These four are the most striking peculiarities of temper which distinguish mankind. A man of perfect character would be one in whom none of these dispositions prevailed, but where there was a just proportion of them all.

Such perfection perhaps exists not in this world. Every individual has a greater tendency to one or more of those qualities, than to the rest; and he is said to be of that Temperament to which he chiefly inclines.

As two of these Temperaments are opposite to the other two, it is impossible that they can exist in the same person. Cheerfulness and melancholy, passion and calmness, can be no more united in the same person, than solidity and *liquidity* in the same substance. I therefore cannot help thinking, that Dr. Cullen is mistaken in mixing the sanguine and melancholic Temperaments, and from his conjunction forming

ing the two others. Cheerfulness and melancholy seem to me incompatible in the same person at the same time; and although he may be at different moments of the one, and of the other; yet he can only with propriety be said to be of *that Temperament* to which he has the greatest bias.

And, besides, if it were possible to unite cheerfulness and melancholy at the same moment, still the produce of this union would neither be rage nor tranquillity. But although the opposite Temperaments cannot be blended with each other, those which are not opposite can.

We frequently see men who are tolerably cheerful, and yet are easily kindled into anger and rage; and others of a cheerful temperament, and yet of a calm character. A melancholic man may likewise either be characteristically passionate or calm.

The greater part of mankind are made up of these mixtures, it being rare to

find any person purely of one Temperament.

It will now be proper to give the discriminating marks of the four Temperaments more particularly, and at greater length.

The sanguineous Temperament is principally distinguished by gaiety, cheerfulness, and a fine flow of animal spirits. Persons possessed of it are usually benevolent and unsuspicious.

The faults with which they are charged, are unsteadiness in their pursuits, inconstancy in friendship and love, and a great desire of pleasure. The bodily marks are so fully described by Dr. Cullen, that I can make no addition. The hair is soft and never much curled, of a pale colour, or, from thence passing through different shades, to a red. The skin smooth and white, the complexion ruddy, the eyes com-  
monly



monly blue, the habit of the body plump, disposed to free perspiration upon exercise, and the bodily strength moderate.

The solids of persons endowed with this Temperament are lax, and in small proportion to the fluids. The blood abounds with serum and red globules; the pulse is soft. Those of this Temperament are generally of a delicate constitution, liable to colds, catarrhs, hemorrhages, scrophula, and consumption.

The melancholic Temperament is distinguished by a grave and serious turn of mind. Persons endowed with it are generally steady in their pursuits, and constant in their attachments. They are not apt to be inflamed with anger; but, when provoked, they are not easily appeased; not variable, but determined in their purpose, and often distinguished for an enthusiastic turn of mind, depth of thought, and great mental powers.

People of this Temperament are also liable to obstinacy, suspicion, lowness of  
D 2 spirits.

spirits, and misanthropy. The external appearances, according to Dr. Cullen, are, dark, hard, and curled hair; the skin is coarse, and of a dun colour; the eyes are either black, or very dark; the body is hard and meagre, and of considerable strength. I have likewise observed, that men of this Temperament have often a great deal of hair upon their bodies. Their solids are rigid, and in a large proportion to the fluids. The blood abounds with gluten; the pulse is hard.

People of this Temperament are liable to disorders in the *primæ viæ*, indigestion, flatulency, and costiveness, nervous distempers, hypochondriasis, and sometimes insanity.

The choleric Temperament is known by extremely quick feelings, and a violent irascible disposition.

Persons of this Temperament often possess a daring active courage, but  
are

are too apt to be severe, and sometimes cruel.

The external marks are brown skin, with very little colour in the cheeks, the hair brown, the eyes are grey, quick, and fiery, strongly expressive of the character. Such persons are usually of a small stature, but possess considerable strength. The muscles firm, but not rigid, and the fluids and solids well proportioned; the pulse quick. The diseases to which they are most subject, are inflammations and ardent fevers.

The last Temperament we have to describe, is the phlegmatic. Those who possess it are extremely calm, and usually good-natured. Their courage is of a passive kind. The faults of this Temperament are, insensibility, and sometimes dulness. The external figure of persons of this Temperament is generally large and clumsy; they are much disposed to corpulency. Their complexion often fallow; the hair soft, and

pale coloured; the eyes light and inanimate. They have little strength; their muscles are soft and flaccid. The proportion of serum in their blood is very great; the pulse is slow.

The diseases they are oftenest afflicted with are, dropsies, agues, and chronic complaints,

It is necessary to observe, that the distinguishing marks of the various Temperaments are to be considered comparatively with people of the same climate and country.

Thus, although the English are a fairer people than the French, it is not therefore to be concluded, that the first are of a more sanguine Temperament than the other; for the reverse is true. But it is found, both in France and England, and every where else, that the fairest individuals of each country are usually sanguineous, and the darkest melancholic.

Those

Those considerations naturally lead us to suppose, that a mixture of different nations would improve the human species. This has long been found just with respect to vegetables; and some animals, particularly the horse; that it is likewise the case in the human species, I think very probable: for in a man of a perfect character and figure, no one Temperament could prevail more than another, but there would exist a just proportion of them all. This combination is certainly most likely to be produced by the inhabitants of different countries mixing together.

## O F A L I M E N T S.

**H**AVING finished with Temperaments and some other preliminary matters, Dr. Cullen begins his treatise on the *Materia Medica*.

He divides his subject into two parts: the first treats of Aliments; the second, of Medicines.

I shall proceed to consider the first part.

As our Aliments are converted into blood, before they form any of the component parts of the body, this subject is very properly begun with a discussion on the nature of the blood.

The largest portion of the blood is elementary water, which gives fluidity to the whole, and fits it for circulating through the vessels.

The next considerable portion of the blood is the gluten, or coagulable lymph.

This



This Dr. Cullen supposes to be that part of the blood which affords the matter of the solids of the body, and he gives the following reason : “ In all its qualities, it very  
“ nearly resembles the solid matter of the  
“ body, while in any other part of the fluids  
“ there is no such resemblance \*.”

Here Dr. Cullen seems to have forgotten, that there is in the serum a portion of matter which coagulates by heat, or by being mixed with ardent spirits and essential oils; which, when coagulated, resembles the solids, as much as the gluten.

It seems therefore probable, that although the gluten forms the *principal* part of the solids; yet that some part may be formed from this coagulable matter in the serum. It would not be a valid objection to this opinion to say, that this matter cannot be changed into a solid in the living body, because the heat is not great

\* Dr. Cullen's *Materia Medica*, vol. i. p. 219.

enough



enough to coagulate it, and there are no ardent spirits or oils to produce that effect. For, although *we* have no other mode of changing this fluid into a solid than the above; yet *nature* may.

Vegetables of a very considerable degree of solidity grow in simple water: and why may not the blood vessels in the human body be able to separate the solids dissolved in the serum, as well as the sap vessels in vegetables, which separate the solids dispersed in the water, and by some mixture or power even consolidate the water itself?

This opinion gains strength from another circumstance. None of the vegetable matter is found in the urine or perspirable fluid.

There can therefore be little doubt, but that the coagulable matter in the serum is either converted into the solids, or employed in some of the secretions; perhaps both takes place.

Dr.

Dr. Cullen, however, is of a different opinion, as appears by the following quotation \* :

“ The gluten seems to be constantly,  
“ although perhaps slowly, proceeding to  
“ a putrid or putrescent state ; as we know  
“ that if fresh Aliment is not constantly  
“ supplied, the whole of the fluids will, in  
“ no long time, become very putrid. In this  
“ progress, as in other processes of putre-  
“ faction, we find the mild and perfectly  
“ neutral substance changed into a saline  
“ state of the ammoniacal kind ; and this  
“ saline matter being washed off from the  
“ entire gluten by the water which con-  
“ stantly accompanies it, seems to form  
“ the *serosity* of the common mafs. It is  
“ this again which nature, in order to pre-  
“ vent an undue accumulation of it, has

\* Vide vol. i. p. 220.

“ provided

“ provided for being carried out of the  
“ body by the several excretions.”

In the above quotation, it is evident, that Dr. Cullen considers the whole of the serum as excrementitious. And he also decides on another subject, which has produced much controversy among medical writers, and remains still *sub lite*: namely, that a degree of putrescency takes place in the blood, while circulating in the living vessels.

Some are of opinion, that the blood has a constant tendency to putrefaction in the living body, and that it is only prevented from becoming completely putrid by the excretions which carry off the putrescent particles, and by supplies of fresh alimentary matter which are brought in.

Others, on the contrary, assert, that there never is the smallest degree of putrefaction in the blood during life.

Having

Having weighed the arguments on both sides with all the attention of which I am capable, I shall endeavour to state what is most material in the controversy, as clearly and as shortly as I can.

During the putrefaction of dead animal matter, a quantity of saline substances is formed in it, and volatile alkali and fixed air are let loose from it, occasioning a peculiar foetor.

It is admitted, that the same alterations never entirely take place in the living body, although it is asserted by some, and denied by others, that a slight putrefaction does occur even in good health, and a much greater putrefaction in some diseases.

Let us consider to what this difference of opinion is owing.

When the serum of the blood is examined by chemical analysis, it is found to contain a certain quantity of ammoniacal salts, particularly

ticularly common fal ammoniac, phosphoric, and fixed ammoniac.

Urine and the perspirable fluid likewise contain the same salts in a much larger proportion.

But none of those salts being found by analysis in the usual Aliments of men, it is allowed on both sides, that they must be generated in the body. And as they are in greatest abundance in the excretions, it is natural to conclude that they are of a noxious quality.

Thus far all parties are agreed; what then is the dispute? Merely that the one party calls this conversion of animal substance into ammoniacal salts, a slight degree of putrefaction, notwithstanding that the other marks of this formation do not occur; and that the other party refuse it this name, because the production of volatile alkali, fixed air, and other circumstances, in their  
opinion

opinion essential to the nature of putrefaction, do not take place.

Like many other violent controversies, therefore, the whole of this contest concerning putrescency seems a mere dispute about words.

Let the disputants only agree in a clear definition of what they mean by putrefaction, then any man of plain sense, with a moderate knowledge of chemistry, will decide in a moment, whether the circulating mass undergoes any degree of putrefaction or not.

But while the one party persists in denominating certain changes which the fluids undergo in the living body putrefaction, and the other uses this term only to such changes as occur after death, there can be no end to the dispute; for this plain reason, that the same word is taken in different senses. All agree that changes do take place in the fluids, both in health and disease.

Those



Those which occur after death were originally called putrefaction. If this term were confined to those only, and if physiologists would invent another for those changes which take place in the living body, the dispute would be at an end.

The only remaining portion of the mass of blood is the red globules. Dr. Cullen has said little concerning them, and indeed the subject is so difficult, that no one has ever formed any probable conjecture respecting either their formation or use.

I shall only observe, that it appears impossible for them, while in their state of globules, to contribute either to nutrition or secretion, their size preventing them from entering the minute vessels which are adapted for those purposes. If they could enter, all the other parts of the blood could likewise enter, and a hemorrhage would ensue.

Nobody, whose evidence can be depended upon, has ever seen their dissolu-



tion, or their reduction to a less bulky form, actually take place; yet this must be continually happening, in order that the old globules may be removed, and that a new set may be formed.

What becomes of them afterwards is difficult to say; for none of the secretions, nor any part of the blood independent of red globules have a red tinge; it is therefore certain they must lose their colour, in losing their size.

Of all the secretions, that which resembles them most is the bile.

The taste of the red globules is sweetish, that of the bile is a sweetish bitter. Both of them are inflammable, and of an oleagenous nature; and they both yield in distillation a large portion of empyreumatic oil.

It must be acknowledged, however, that they differ in many circumstances; but those in which they resemble, render it not

very improbable, that some part at the least of the red globules are changed into bile.

After descanting upon the blood, Dr. Cullen proceeds to inform us, that all the Aliments of mankind are of an animal or vegetable nature, water excepted, which belongs to the fossil kingdom.

The substance of other animals is so similar to our own, that it does not appear so wonderful, that, by some process of the animal œconomy, it should be converted into our own substance.

But vegetables of every denomination are so very different from the matter which composes the human body, that their conversion into it seems much more difficult and extraordinary.

Of the vegetables which are used by mankind as food, it is only certain parts, and not the whole of their substance, that is nutritive. And there are vegetables no part  
of

of which are so; for they entirely resist being converted into the substance of the human body.

Dr. Cullen asserts\*, “ that for the most  
“ part those vegetables are rejected from  
“ the list of Aliments, that are imbued  
“ with any strong odour or taste; and at  
“ least of the sapid, all except the acid and  
“ sweet, are excluded.”

This, with a few exceptions, is certainly just.

But it does not follow, that, because we reject all vegetables whose taste and odour are strong, that we adopt all those whose taste and odour are weak.

It is not possible to comprehend in a single sentence all the species of vegetables which are used as food by men. They are too various and too numerous to be described without particular enumeration.

\* Dr. Cullen's *Materia Medica*, vol. i. p. 225.

We use the seeds of some; the leaves, the fruits, the roots, the tops, the juices of others: and not satisfied with the variety which nature affords, we produce, by means of cultivation, an artificial variety.

We increase the quantity of nutriment, and improve the flavour of those which are wholesome, and change some which are naturally acrid and poisonous, to a bland and innocent Aliment.

Hardly any of the vegetables used by men, but has been altered from its original state; and many of them, after they are taken from the earth, undergo a variety of new processes before they are used by them as food. Some are ground, sifted, fermented, and baked, and few are eaten till they are altered by fire.

In all this artificial management, as well as in the original choice of the vegetables, men are solely directed by their taste. And, with very few exceptions, it may be asserted,  
that

that every vegetable which is agreeable to the taste is wholesome, and those which are disagreeable are unwholesome.

We are attracted by the flavour and taste to eat those vegetable substances which are most wholesome, and taught by the same directors to shun those which are poisonous; Nature not having entirely left the important business of nutrition to a guide so liable to error as reason, or to one so dangerous as experience.

The brute creation are said to discover the food proper for them by instinct. But instinct, in this instance, is nothing more than smell and taste, which is likewise possessed by men.

Every individual vegetable, besides the general matter common to all, contains something peculiar to itself, which gives to each its taste and flavour. When the taste is agreeable the vegetable is eaten, and all those are in some degree nutritive.

When, on the contrary, this peculiar substance of the vegetable impresses the nerves of the tongue in a disagreeable manner, it is rejected.

But, should any one, contrary to his natural inclination, force himself to swallow a considerable quantity of any of those disagreeable vegetables, he will never fail to feel himself disordered.

Medicines are of this class, and highly improper to be used as Aliment when we are in good health, however proper to remove diseases when the body is disordered.

But these observations, like all general rules, are liable to some exceptions.

After informing us what vegetables are improper food, Dr. Cullen goes on to the examination of what are the ingredients in vegetables fitted to enter into the composition of the animal fluid,

He



He asserts, that these are, an acid, a sugar, and an oil. Each of which he considers separately.

With respect to the acid, Dr. Cullen imagines\*, that this is a necessary ingredient in the composition of the animal fluid. And he is of opinion, that soon after vegetables are taken into the stomach of a healthy person, they undergo the acetous fermentation, whereby an acid is always more or less evolved. But as this acid disappears when the food advances from the stomach into the bowels, he thinks it must have entered into the composition of the animal fluid.

That vegetables undergo the acetous fermentation in the stomach, has been long an established opinion; and it was likewise thought, that the digestion of vegetables was owing principally, if not entirely, to this fermentation.

\* Dr. Cullen's *Materia Medica*, vol. i. p. 227.

But more accurate inquiries, and experiments of a very late date, by the sagacious Hunter, the laborious Spallanzani, and others, have in my opinion fully proved, that the solution of our food is performed, not by the acetous or putrefactive fermentation, but by a menstruum secreted in the stomach.

From what I can collect in the detached parts of his work, I conjecture that Dr. Cullen is of opinion, that it is partly produced by the menstruum, and partly by fermentation. That there is frequently an acid in the stomach, is true; that it is produced by the fermentation of vegetables, I cannot believe. I rather think it is a juice secreted by the coats of the stomach.

I am led to this by the following considerations:

Acidities are often perceived in the stomach within half an hour after eating, whereas it takes several days before the same vegetables can produce as complete  
an

an acid by fermentation out of the body, although placed in circumstances the most favourable for that process.

In order to account for the sudden appearance of acid in the stomach, those who credit the acefcent fermentation, are compelled to suppose, that there is a ferment able to produce the sudden fermentation which takes place there. Which hypothesis, besides other objections, is liable to this, that we are acquainted with no ferment so powerful as this is supposed to be. So that the supporters of the above hypothesis have first to suppose a ferment, for whose existence we have only their assertion; and then that this ferment is more powerful than any other known in nature, for which we have no better authority.

But, notwithstanding every objection, let us for a moment admit, that a ferment, with all the powers requisite, actually exists in the stomach; still this ferment must be an acid.

Here

Here then it is granted, that the stomach secretes an acid. Well, since we are in possession of this, why should we have recourse to a second kind of acid, produced by the fermentation of vegetable substances?

Is it because the acid seems sometimes to be in too great quantity to be produced by secretion alone?

If so, it may be answered, that in healthy stomachs the quantity of acid is always small, and that excess of acidity is a disease. And why should an extraordinary secretion of the juices in the stomach appear more singular, than that of other secreted liquors. The milk, the bile, and the tears, are formed in uncommonly large quantities, when the breasts, the liver, and the lachrymal glands, are affected in a particular way.

There is, however, another circumstance which convinces me that acidities in the stomach are not owing to fermentation.

For if this were the case, such acidities would principally take place after eating those

those vegetable substances which ferment most readily ; and less acidity, or perhaps none, would occur after eating such vegetable substances as are known to ferment with difficulty, or not at all.

But the reverse of this is found in fact ; for dyspeptic patients complain but little of acidity, after eating the pleasant acid and sweet fruits, whose juices quickly ferment out of the body ; whereas the same patients are much disturbed with acidities upon eating the oily kernels of nuts, which resist the acetous fermentation. And what seems quite decisive of the argument, expressed oils and fat, which occasion the greatest acidity, are absolutely incapable of growing sour.

To all this it may be added, that if acidity in the stomach were owing to the acetous fermentation, a dissolution of the vegetable substance in the stomach would necessarily take place at the same time ;  
confe-

consequently, such acidities would occasion a quicker digestion. Whereas it is well known, that the excess of acid is a proof of a slow and ineffectual digestion.

These considerations, I own, persuade me, that the acid in the stomach never is the effect of fermentation, but is always a secretion; and that the excessive acidity which prevails in dyspepsia, is owing to an increase of this secretion.

I do not mean, however, to deny that the *native* acid of vegetables forms an alimentary substance, as Dr. Cullen affirms. But that it is a *necessary* ingredient in our food, in order to prevent the putrescency of the fluids, (as he imagines,) I confess I very much doubt. Indeed, that vegetable acid is absolutely necessary for this, or any other purpose, is contradicted, by our knowing that men in some parts of the world seldom or ever taste vegetables, yet enjoy as good health as those that do.

Having



Having finished with acids, Dr. Cullen proceeds to the consideration of those ingredients which form the remaining nutritive parts of vegetables, namely sugar, and oil.

The remarks he has made upon each of these substances are admirable. And I think he has offered strong reasons for believing, that these ingredients make the chief nutritious part of vegetables.

He admits, however, that there is *some* nutriment in a peculiar substance discovered by Beccaria in wheat, and which very much resembles animal matter.

Those, according to Dr. Cullen, are all the ingredients in vegetables which afford nutrition. But since Dr. Cullen, another very learned physician has published a philosophical treatise on digestion, in which he asserts that the principal nutrition derived from vegetables consists in mucilage.

These

These two opinions are not in reality so different as at first sight they may appear. For there are strong reasons for believing, that mucilage consists of the same elementary particles with sugar, acid, and oil, which are the three materials from which Dr. Cullen thinks nutrition is derived; and it is well known, that chyle and blood can be formed equally from mucilage and those three materials.

Dr. Cullen omits to mention, that the earth which exists in our food is also a source of nutrition. And Dr. Fordyce, the physician above alluded to, expressly asserts, that calcareous earth gives no nourishment to the human body.

I own this surprises me a good deal; because, by a chemical analysis, it is known, that there is a considerable quantity of calcareous earth, and calx phosphorata, in the human body, particularly in the bones.

This

This did not escape Dr. Fordyce ; but he says, that these substances are only deposited in interstices, a circumstance which, in my opinion, does not make them less necessary for nutrition. For whether the earthy particles are in one solid unmixed mass, or are interspersed among mucilage, is immaterial to this point ; they undoubtedly are a very essential part of the human body. And although it is said, that the earth is deposited in the interstices of the mucilage, it might with equal propriety be said, that the mucilage is deposited in the interstices of the earth. The fact is, that they are intermingled with each other, and both are requisite in the composition of the animal frame.

Calcareous earth and calx phosphorata are therefore substances which are obtained from our aliments, as well as those formerly mentioned ; and they are found to exist both in the blood and chyle, and form  
a part

a part of almost all the animal and vegetable matters we feed upon.

These are certainly the chief, if not the only substances which are extracted from vegetables for the purpose of nutrition. The remainder of the vegetables is thrown out of the body.

Of animal substance, a much larger proportion is nutritious, than of vegetable. Indeed it is probable, that almost every part of an animal substance is capable of affording nourishment, although in general the hard and dense substances are not digested, because a sufficient quantity of more soluble food is usually taken at the same time.

But where there is great scarcity, as in besieged towns, the inhabitants have at last been reduced to eat the hardest leather; which has been found to digest, and afford nutrition: and Dr. Cullen mentions a well-known fact, that the Laplanders make bread of powdered fish bones.

The process by which alimentary matters are digested and converted into chyle, and afterwards into blood, has occasioned much speculation. Great light has lately been thrown upon the subject by a number of experimental philosophers.

It has been proved in the most satisfactory way, by experiments made both on the human body and on animals, that a juice is secreted in the stomach which dissolves our food. And it is a singular but undoubted fact, that this juice, or some other in the stomach, has the power of coagulating milk, serum, and other coagulable mucilages.

All coagulable substances therefore, when taken into the stomach, are first coagulated, and afterwards dissolved, by this gastric juice.

There has perhaps hardly ever been any fact better ascertained, than that the gastric juice acts as a solvent.

The experiments which have been made to prove this are almost innumerable, and the gastric juice is found to possess this dissolving power, not only in the living stomach, but even out of the body.

Dr. Fordyce, however, in his dissertation upon digestion, I find does not credit it.

Yet the bent of his arguments goes only to demonstrate, that the gastric juice does not convert alimentary substance into chyle, either by solution or precipitation, and in this he certainly is successful, and refutes Dr. Stevens, who appears to have had that opinion.

But although Dr. Fordyce has shewn that the gastric juice does not convert aliments into chyle; yet he does not disprove, that the gastric juice occasions a solution of the solid part of our food. We have the same evidence for this, that we have for believing that the vitriolic acid dissolves iron. For the gastric juice has  
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been



been found to dissolve meat out of the living body, and after death to dissolve the stomach itself.

When fluid substances are taken into the stomach, if they are of a coagulable nature, they are first coagulated, and afterwards dissolved. But when incapable of coagulation, they are mingled with, and acted upon, by the gastric juice.

After passing from the stomach into the intestines, they are combined with the bile and pancreatic juice.

In consequence of the action of all these secretions, the fluid and solid aliments are all changed into a fluid of a more homogeneous nature. Even expressed oil loses its form, and mixes uniformly with the rest. This operation resembling, in many circumstances, a chemical process, is called digestion.

It cannot with propriety be denominated either the vinous, acetous, or putrefactive

fermentations ; because neither wine, vinegar, nor putrid matter, are formed in the stomach during digestion.

If it is insisted on, that it shall be called a fermentation, it must be the chylous fermentation.

Digestion is erroneously supposed by some to be the conversion of aliments into chyle. Whereas it is only the conversion of aliments into a fluid, from which chyle can be formed.

The gastric juice, bile, and pancreatic juice, have no power of forming chyle, which substance is never seen in the stomach or intestines. Chyle is a secretion formed from the digested aliments by the lacteals. And the lacteals alone have the power of forming it. It is as fruitless to search for chyle in the stomach and intestines, as it would be to look for bile or milk in the arteries.

Blood

Blood is a fluid from which the mam-mæ and liver can extract milk and bile; and digested food is a fluid from which the lacteals can extract chyle. How the lacteals effect this, is an interesting question, but equally difficult to explain as any of the other secretions. It is certainly a chemical process. But chemistry has not yet arrived to that point of perfection, to demonstrate precisely the affinities and attractions by which it is accomplished.

The operation by which aliments afford nourishment is very complex.

In the first place they are dissolved in the stomach, and changed into a peculiar soft substance by their mixture with the gastric juice, bile, and pancreatic juice.

Secondly, that very singular fluid the chyle is secreted from the mass by the lacteals.

The third process is sanguification, or the conversion of chyle into blood.

The blood of all men, whether they live upon animal or vegetable food, appears to be nearly the same. The chyle likewise appears of the same nature, from whatever aliment it has been extracted. Not however precisely the same, for there is reason to believe, that there are some slight differences; I only mean therefore that all the essential and distinguishing properties are the same. It follows then, that all those substances which are the usual and principal aliments of men, must have the ingredients for forming chyle and blood in them; and that the human body has the power of extracting and combining these ingredients, so as to form chyle and blood. Upon this view of the subject, it would seem immaterial which of the various kinds of aliments were chosen. And in fact it is found that, in different parts of the world, strong and healthy men are nourished by very different kinds of food; some feeding  
ing

ing chiefly upon animal substances, and others entirely upon vegetables.

Of animal food some nations use, for the most part, terrestrial animals; while others live almost entirely upon fish. With respect to vegetables, rice, wheat, oats, potatoes, maize, cocoa nuts, and the bread fruit, form the chief or sole nourishment of many nations.

As stout and healthy people are maintained by all those different aliments, it is difficult to prove which is the best.

If the medical people in different countries were questioned, each would probably approve of the diet used in his own. He would find plausible arguments to prove its superiority, with numerous and admirable examples among his countrymen in support of his theory.

An Englishman would be of opinion, that wheat bread, and a large portion of animal food, give the strongest and most

substantial nourishment. Whereas an Irishman or a Scotchman would probably maintain, that a small portion of animal food, with plenty of potatoes and oatmeal, is far better adapted to form a vigorous and hardy race. But these differences are inconsiderable, in comparison with some others. For the Laplanders live almost entirely upon animal food ; and the Hindoos, Gentoos, and many tribes and nations in Asia, Africa, and America, never taste any thing but vegetables.

Were we to attempt to ascertain by analogy what species of aliment is best adapted for producing great bodily strength, we should find it impossible. For the lion, the eagle, the whale, and the elephant, all possess prodigious strength, and all live on different kinds of food ; the latter feeding entirely on vegetables, the others upon animals which inhabit the earth and sea. Most animals, however, confine themselves to one  
kind



kind of food ; but this is not the case with man. He seems to have been intended to inhabit and possess almost every part of the globe. He is accordingly endowed with organs which can digest with equal ease a great variety of substances the produce of every clime.

It having been observed that men have incisor teeth like carnivorous animals, and grinders like phytivorous ; some physiologists have inferred, that men were intended to feed on a mixed diet of both animal and vegetable substances.

But it is perhaps as natural to conclude from this fact, that they were made capable and intended to feed upon either. And indeed it appears evident, that all those aliments generally adopted by nations as their most constant food, are nearly equally well fitted for the nourishment of men ; and that vegetable food, animal food, or a mixture

mixture of both, are all capable of rearing men to their utmost perfection. This conclusion does not coincide with Dr. Cullen's opinion, who throughout his work shews a strong preference to vegetable food.

He imagined that the acid in vegetables is a necessary ingredient in our aliment, in order to correct the alkalescency of the blood, and to prevent its too great tendency to a putrid state. He had formed an idea that the flesh of carnivorous animals is more alkalescent than that of the phytorous; and that alkaline blood is not fitted for the purpose of the human œconomy.

He therefore was of opinion, that a certain portion of vegetables in our food was absolutely requisite to prevent our blood becoming too alkalescent, and of course liable to putrid diseases.

All these notions, however, respecting alkalescency are hypothetical, and there  
seem

seem not sufficient grounds for adopting them.

For it clearly appears, that animals have the power of entirely changing the properties of the food they eat, and rendering it suitable to their bodies. Mr. Hunter found, that when putrid meat was given to a dog, it became perfectly sweet, after remaining a short time in the stomach. And it is known that the juices of maggots, which live upon putrid flesh, are as untainted as those of the bee, which sucks nothing but flowers.

Hence it appears not only probable from theory, but evident from facts, that the human blood is in no greater danger of becoming too alkaline or putrid from a diet of animal substance, than it is of becoming vinous or acescent from a vegetable diet. When digestion goes on well, chyle and blood are formed, which are always the  
same,

same, and as long as there is life, they are never either putrid, vinous, or acid.

Dead substances alone undergo these fermentative processes, in order that the matter may be decomposed; for after death it is necessary that the matter of the body should suffer decomposition, to enable it to assume another shape.

Animals and vegetables are certainly formed of the same component particles.

This has not been fully demonstrated by any set of chemical experiments; but it is proved by their mutual resolution into each other. Animals live upon vegetables, and vegetables are manured and nourished by animal substance. Each afford nutriment to the other. Both have therefore the same original particles; and both have the power of decomposing and combining them in the manner adapted to their nature.

Does it follow from the above observations, that all diatetic doctrines are useless;  
and

and that it is a matter of indifference what diet we prescribe for our patients? By no means; I have only attempted to prove, that in general those substances which have been commonly adopted by different nations as their sole or chief food, are all nearly equally well adapted for nutriment.

But there are many circumstances which make a choice of aliment beneficial to particular persons. The power of habit on the animal œconomy is in no instance more remarkably shewn than in diet. If any one suddenly changes his food, and feeds upon substances to which he has been unaccustomed, he will undoubtedly become disordered.

If a person accustomed to vegetable farinacea, tries to eat a large portion of animal food, he will become feverish and plethoric. And if one accustomed to meat suddenly adopts a vegetable diet, he will be in danger of losing strength, and being seized with indigestion.

This

This is one reason why a variety of food is unwholesome, for the stomach cannot acquire the habit of digesting a variety of aliments with equal facility.

Those persons therefore who use one or two kinds of aliments constantly and regularly, have their stomachs in far better order than those who indulge themselves in variety.

But it would appear that even the habit of digesting a variety of aliments is in some degree to be acquired. For persons accustomed to variety are less disordered by it, than others; although their digestive faculty is probably not in such perfect order, as it is in those who live in a more simple manner.

We need not then be surprised at the frequency of stomach complaints among the rich; for the luxurious superfluity of whose tables the earth, air, and sea, are ransacked.

This



This variety, especially when prepared with Eastern spiceries and all the refinements of modern cookery, has another bad effect; it produces a false appetite, and forms a temptation to indulge the palate after appetite is gone, by which the stomach is gorged and overloaded. Whereas those who live upon a few plain and simple dressed aliments, have no excitement to eat more than their natural appetite prompts.

From these, and many other causes, disorders in the stomach are frequent. And as some aliments are more easily digested than others, directions respecting diet are necessary for weak and disordered stomachs, which are unable to digest aliments, that are easily overcome by stomachs of greater health and power.

Beside the facility of being digested, each aliment has certain properties which fit it for peculiar complaints, and peculiar states of blood. It is therefore of great importance to examine these peculiarities.

The

The circumstances we are chiefly desirous of knowing respecting aliments are,

In the first place, Which are most nutritive?

Secondly, Which are easiest digested?

Thirdly, Which are of a stimulant or heating nature?

Fourthly, Which are of a sedative or cooling kind?

I shall proceed to examine these questions, and to mention the particular substances which possess these qualities.

If the whole substance of each of our aliments were converted into chyle, then equal weights of each would give precisely the same quantity of nutriment. But this is by no means the case; for some alimentary substances give more chyle in proportion to their weight, than others; and only a small portion of those aliments which give the most chyle is converted into that fluid, and the remainder is evacuated as useless.

As

As the bodies of men and the substances of those animals we feed upon, are nearly the same, it might be expected that little or none of our animal food would become excrementitious. The truth, however, is as above stated; a large portion even of animal food is requisite to form a small quantity of chyle.

This is not owing to there being any ingredients in beef or mutton, for example, which are not required in the human body; but because these ingredients are not perpetually wanted in the human body in the same proportion in which they exist in these Aliments.

As some particles of our bodies waste faster than others, these particles require to be renewed faster.

The chyle is a compound fluid, consisting of particles in the same proportion to each other, with those particles in the blood which are usually wasted.

The chyle therefore supplies the blood with particles exactly similar to those which are generally wasted. But, as the particles of our Aliments are the same with those of the chyle, although combined in a different proportion; and as the latter is extracted from the former, it follows, that our Aliment must be of greater quantity than the chyle; and that some part of the food must be excrementitious.

The chyle of many animals is not very different from the human.

If therefore it could be procured in sufficient quantity to be used as food, it would be infinitely the most nutritive of all Aliments; because the whole, or nearly the whole, would be converted into human chyle, and hardly any of it would be excrementitious.

The most nutritious substance, next to chyle, perhaps is fat.

The

The following observations led me to this opinion. It is remarked that the northern bears, and all those animals who pass the winter in sleep, are extremely fat previous to their falling into the sleepy or torpid state, and thin and lean when they awake in spring. From this it is natural to conclude, that the whole of the fat has been absorbed during the winter months, to supply the waste of the circulating blood.

As it is evident from this, that the fat of those animals is a deposit to supply them with nutriment during that period in which none is received by the mouth; it cannot be doubted, but that nature would place in the body a substance perfectly well adapted to the purpose she intended.

It seems extremely probable therefore, that fat is one of the most nutritious substances existing.

Men, and those animals who are never in the torpid state, have no need of this

accumulation. To them it is generally an incumbrance; and sometimes in adults takes place to a great degree, in consequence of using too full a diet, and taking too little exercise. By this mode of life the blood becomes too great in quantity, and too rich. And it seems probable, that the fat is thrown out by the vessels, in order to relieve them from the plethoric state. If this is the case, it is clear that the evacuation of the richest part of the blood would give the greatest relief; it is therefore not unnatural to conclude, that the part thrown out is the richest.

Besides these presumptions drawn from reasoning, the late very ingenious Dr. Stark informs us, that on his making trials of a vast variety of food, he found that a smaller quantity of fat, than of any other substance, was sufficient for his sustenance.

Butter, and the expressed oils of vegetables, which are exceedingly similar to fat, are  
6 likewise



likewise extremely nutritive, but all these substances are of difficult digestion.

Weak stomachs are disordered by even a small portion of most of them. Butter seems to be the lightest to an English stomach; but this probably proceeds from habit.

I am apt to think that eggs are nutritious in the next degree. They afford nourishment and growth to the young chick, and the whole yolk is converted into the substance of the animal. From the use of the egg, it is evident, that it is intended to contain as much nutriment for the chick in a small compass as possible.

A substance so exceedingly nutritious for this animal, it is natural to think will likewise be so in a considerable degree for men. On this, however, I should not place a great deal of weight, if those who use eggs in their diet did not agree, that they are remarkably nourishing. They are more light,

and easier of digestion when moderately boiled, than quite hard. In this last state, the white is particularly difficult of digestion, as appears by Mr. Goffe's experiments, and perhaps is the least nutritive.

Eggs are generally believed to be a stimulant kind of food; but I imagine they have acquired this reputation, principally from their being extremely nutritious.

The next alimentary substance I shall take notice of, is blood. That of the hog particularly is used in this country, made into puddings; and the Laplanders feed much upon the blood of the rein-deer.

There can be little doubt, that blood must be extremely nutritive, even more so than the flesh of the animal. For, as all our food is to be converted into blood, a pound will probably form more human blood, than a pound of flesh.

But it must be recollected, that a substance, being extremely nutritious, is not a  
proof

proof of its being extremely wholesome. For it was formerly pointed out, that vegetable food, which is much less nutritious in general than animal food, is, notwithstanding that, equally wholesome.

The ancients had a notion, that the blood of bulls was poisonous: this is entirely groundless. To a man with a strong stomach, there are few substances which, in an equal quantity, would preserve life so long. Yet blood is difficult to digest; the puddings which are made of it in this country, are perhaps the heaviest food in use.

We come now to consider the flesh of those animals which form our principal Aliment.

That of the hog being the fattest, is certainly the most nutritive; but it is difficult to digest. Persons who have weak organs of digestion, or are unaccustomed to this food, are usually disordered by it. Those who

have stronger stomachs, however, find it wholesome.

Pork is therefore very judiciously chosen as part of the Aliments of our seamen and soldiers, because a less portion of it than any other meat gives sufficient nourishment. When salted, it is easier digested, than when fresh, because the salt stimulates the stomach.

Young sucking pigs are still heavier than full grown pork, because they are fatter.

Beef and mutton are the lightest and easiest digested Aliments in use, and afford a considerable quantity of nourishment, though less than those hitherto mentioned.

Veal and lamb are much more difficultly digested, than older meats.

Lamb, particularly, is heavy; veal, however, like all white meats, is less stimulant than beef. It is therefore very properly directed in feverish states of body, preferably to beef, and broth made of it is more insipid

insipid and less stimulant than beef or mutton broth.

Boiled meats are always lighter, but less nourishing, than the roasted or broiled. In boiling, the fat and blood partly oozes out, and is washed off by the water. In the two other modes of cooking, the juices are more retained in the meat.

Venison and hare are readily digested.

The fat of venison appears to be easier of digestion than that of other animals. Both appear rather stimulant.

Geese and ducks are heavy and indigestible to all, except the strongest stomachs. They are likewise a stimulant food.

Turkey is much lighter than the two last mentioned fowls; but still it is rather heavier than the common fowl and pheasant, which are more readily digested, and not at all stimulant.

Partridge,



Partridge, quail, moor-game, the woodcock, and pigeons, are all digested easily, and afford a good deal of nourishment; but they are of a heating and stimulant nature.

Fish, in general, give less nourishment than butcher's meat; the fat fish are however to be excepted; for eels, salmon, and herrings, being of an extremely oily nature, are nourishing, but not easily digested.

Most other fish are light and wholesome; they are frequently recommended with great advantage to convalescents, who have not entirely recovered the powers of digesting stronger food, and who require Aliments neither stimulant nor heavy.

Vegetables in general are less nutritious than animal substance.

Those animals which live entirely on vegetables, as horses, black cattle, and stags, are almost continually feeding.

Sheep



Sheep particularly are hardly ever unemployed when awake. They either feed, or chew the cud : and they bite, when hungry, from seventy to eighty times in a minute.

Whereas lions, tigers, and other beasts of prey, eat rarely. A full meal in several days, or even weeks, is all they require.

Those men likewise who live solely on vegetables, require a much larger quantity of food, than those who live on animal substance.

It is a mistaken notion, that our appetites are the surest guides with respect to the quantity of food proper for us. If that notion were true, no man would eat too much. For no man (except for a wager) ever eats more than his appetite prompts. But neither in our desire for food, nor in other desires, are our appetites to be trusted to. In almost every instance, they would lead us to excess. An infant at the breast,  
if

if permitted, will suck till its stomach is so full, that it becomes sick, and vomits.

Since it is obvious, that the uncorrupted appetites of infants are not to be trusted, even when the milk of their mothers is their only diet ; how much less is the inclination of adults to be fully indulged, whose appetites are excited and prolonged by stimulants and variety ?

In the brute creation, likewise, appetite alone always prompts them to excess.

All domestic animals, if plenty be placed before them, grow fat ; how unwieldy do cows become, if allowed to graze in rich meadows without being milked, or sucked by their calves ! And sheep in the same situation, are such gluttons, that they die in a few years of mere fat.

Scarcity, and not instinct, prevents the wild animals from glutting themselves in the same manner ; their food, being so scantily supplied, that it usually requires their  
whole

whole strength, agility, and address to enable them to procure a sufficient quantity for bare subsistence.

The superior powers of man enable him to provide abundance. He is therefore not prevented from excess by scarcity, like the brutes; neither, as has been shewn, ought he to be guided by appetite: it is reason alone to which he must trust. From experience he discovers the quantity of food which agrees with him, and the bad effects of over-eating. Our reason, therefore, when founded upon experience, is the only guide to be trusted.

Vegetables, having the quality of being in general less nutritive than animal food, are well fitted to form the whole or chief part of the diet in certain constitutions.

There are persons who possess excellent organs of digestion, secrete from the food a great deal of chyle, which is formed into blood, and who do not use such exercise

cise as is sufficient to waste a quantity of blood equal to that which is formed. In consequence of this inequality between the formation and waste of the blood, the fluids must accumulate, and the vessels become too full.

Fat is then secreted, in order to relieve the loaded blood vessels. But if the same circumstances continue, the fat must constantly increase, and become at length an oppressive load; and the plethoric distension of the vessels endanger life from hemorrhages, inflammations, and other diseases.

To correct this kind of constitution, a vegetable diet ought to be employed; and when accompanied with sufficient exercise, cannot fail of success. It is vain to expect to remove it by purgatives and bleedings. These means only produce temporary relief.

Long courses of powerful medicines are dangerous; and cannot prevent the return  
of

of the plethoric state, except by weakening or ruining the organs of digestion.

A vegetable diet is an innocent and effectual remedy.

As fish are the least nourishing genus of animals, they usually enter as part of the vegetable regimen. The fat fish, however, are to be excepted, and likewise rich sauces. Milk, for the same reason, although an animal substance, is always admitted into the vegetable diet.

To conform to such a regimen is at first irksome; habit however makes it become easy, and as agreeable as the more usual food. As sudden changes in the mode of life are sometimes dangerous, the vegetable diet ought to be introduced gradually; and except in extreme cases, it need not be made the sole, but the chief species of Aliment.

As the vegetable diet is proper in one kind of constitution, a meat diet is preferable



able for those of an opposite habit of body. Namely, persons who are emaciated, pale, and feeble, who have weak and delicate stomachs, and are subject to acidities or flatulency.

The appetite of persons of this description is never great, many of them hardly ever feel the sensation of hunger ; but after fasting some time, grow weak and faint. As the quantity of food which they are able to swallow is always small ; it ought to be both nourishing and easily digested.

Most vegetables which are light of digestion give little nourishment, and fat meats, although extremely nutritive, are heavy. Both these species of Aliments are therefore improper ; the leaner meats ought to be the principal part of the diet, and such vegetables, and vegetable juices, as are at the same time light and nourishing.

Another quality of vegetable Aliments, is that of being cooling, or less stimulant than animal food.

From



From this circumstance they are extremely proper in inflammatory complaints, and in a variety of diseases of excitement. There is good reason to believe, that this cooling quality principally proceeds from the acid which is in most vegetable productions ; because those vegetables which are most acid, are most cooling ; and acids, as will be taken notice of hereafter, are in the class of refrigerentia.

Vegetables are likewise generally considered as acescent and flatulent. As these qualities, however, are never perceived by people of vigorous stomachs, the fault seems to lie in the person, rather than in the Aliment. So that acidity and flatulency may be reasonably imputed to disease in the stomach and bowels, and to digestion being carried on in a disturbed and imperfect manner.

Having taken notice of these general qualities, I shall next proceed to consider a

few of those vegetable substances which are chiefly employed as food; and first, of bread.

This forms by far the greater part of the vegetable food, and is generally made of wheat. Wheat, however, is not a vegetable in a natural state, but, like almost all those used by men, has been enlarged and improved by culture. The seed of the plant alone is Alimentary, which is ground, sifted, fermented, and baked, in order to form bread. These processes are too generally known to require description.

It is thought by many, that fermentation renders bread more wholesome; for my own part, I am much disposed to doubt this. Oat-meal, maize, potatoes, and rice, are eaten unfermented, and all of them appear perfectly wholesome. If wheat were made into cakes unfermented, as it sometimes is, without doubt it would be good food likewise, were we equally accustomed

to it. But in weak stomachs, and to those who are not accustomed to unfermented bread, it is apt to occasion acidity.

This is a fact strongly corroborating what was formerly advanced, that the acid in the stomach is a secretion, and does not proceed from the vegetable undergoing the acetous fermentation. For acidity is much less apt to occur after eating bread, in which the acetous fermentation has already begun, than after eating bread in which no fermentation has commenced.

It seems on the whole, that fermented bread is easier digested than unfermented, This, although it renders fermented bread a better food for delicate stomachs, does not render it more wholesome on the whole. Perhaps, it would be better, that our stomachs were accustomed to digest substances not easily dissolved, that they might be strengthened by exertion. For

every part of the human body, as well as the human mind, is improved by exercise.

Bread affords more nourishment than most vegetable substances, and there are few of easier digestion. But it is inferior both in nourishment and facility of digestion to animal food; and some stomachs bear but a very small portion of it, without soon suffering from distension and acidity.

Rice is used all over Asia, and in a great part of Africa and America, as the whole or principal part of the food of the inhabitants.

This fact demonstrates its innocence and wholesomeness. It is likewise a very wholesome grain to Europeans.

Dr. Cullen refutes an ill-founded opinion which prevails in this country, that rice occasions costiveness. If it possessed a quality so prejudicial to the human body, it would  
long

long since have been discovered by the numerous nations who feed constantly upon it.

The discovery, however, has been reserved for this country, where little is used; and of course the observation is little to be regarded.

Rice is of a mild and somewhat sweet taste, extremely mucilaginous, more easily digested than bread, seldom occasioning acidity or flatulency, and on the whole perhaps is the most wholesome grain that is used by man.

It is frequently recommended in diarrhœas, on account of its supposed astringent quality. I agree in thinking it very proper in such complaints, not on that account, but merely because, in digesting, it occasions no disturbance to the Alimentary canal, and is in all other respects wholesome.

Maize, a grain cultivated only in America, forms a good nourishment. It is less agreeable to the taste of most persons than

the wheaten bread, and cannot be made into the form of bread so as to keep for any length of time, and therefore is used only where wheat cannot be procured.

Oatmeal is greatly used in Scotland, in the northern counties of England, and in some provinces of France, and other parts of Europe. It is made into bread unfermented, and is of less easy digestion, than fermented wheat bread. Yet it is certainly a wholesome Aliment to those who are accustomed to it. Whether it is more or less nourishing than wheat, is doubtful.

Potatoes are easier digested than bread, and rarely disagree even with delicate stomachs. They afford less nourishment than those farinacea already mentioned; chiefly owing to the large quantity of water in their substance.

The flower of barley is sometimes made into bread, and is probably less nourishing than oats or wheat.

Bread,



Bread, made of peas and rye, is occasionally used by the poor in this island. It is extremely apt to produce flatulency in the bowels.

I shall attempt to add nothing to what Dr. Cullen has so accurately observed concerning the various culinary plants.

With respect to fruits, the most acid are in general the most cooling; and the sweet, oily, and mucilaginous, are the most nutritive. Almonds, walnuts, the cocoa, pistachio, and the whole race of nuts, are certainly nourishing, but of extreme difficult digestion. Nothing therefore can be more injudicious, than the practice of introducing such substances in deserts, when the stomach is loaded with other food.

It was formerly mentioned, that animals discover their proper food by the senses of taste and smelling; and that men, in a great degree, do the same. A strong presumption may therefore be formed respect-

ing the wholesomeness of alimentary substances, by attending to the natural inclination of men. But the greatest care must be taken, not to confound natural taste, with those which are acquired by habit and prejudice, or brought on by diseases.

It is inconsistent with the admirable order and constitution of the universe, to conceive that men will naturally have a desire for such Aliments as are improper for them, and loath such as are wholesome. But we know that, in consequence of necessity, example, or prejudice, men may be induced to use as food, substances at first disagreeable, but which, by degrees, they may be brought to prefer to more wholesome diet. It is owing to this, that many, the rich in particular, instead of plain and salutary food, prefer what is highly seasoned with hot pungent spices. These acrid and stimulating substances are detested by every person at first; but even children may be induced  
to

to eat them in imitation of their parents and relations ; and having acquired a taste for them, the stimulus given to the stomach becomes at last necessary.

That those stimulants, though they seem to assist, yet, in reality, and at the long run, impair appetite and digestion, is evident from this, that the stomach, which could with ease digest plain food, before it was accustomed to spiceries, cannot afterwards digest it without their assistance. A stomach in this situation therefore may justly be said to be in a diseased state. And it is not without foundation, that diseases, and premature old age, have been imputed to the habit of using stimulating and acrid condiments.

Dr. Cullen seems to me to treat them rather too favourably. Though it must be acknowledged, that some individuals, after acquiring this habit, enjoy good health and arrive at old age. But these exceptions  
cannot

cannot overturn the general rule. It is well known that in all countries the strongest and most healthy men are those who live upon the plainest diet. This must therefore be the best: A dispeptic patient will find temporary relief from the use of cloves, kyan, and liqueurs; because they rouse for a moment his languid organs of digestion; and the stomach of a glutton gorged with too full a meal, stands in need of such auxiliaries to assist its natural power. But to a temperate man in good health, they are not only unnecessary but hurtful.

The same observations are applicable to the custom of eating meats which are become tender, and tainted with some degree of putrefaction. This is less general in this country, than in some others upon the continent of Europe.

Every child naturally abhors tainted meats, and all the nobler animals, and those whose structure resembles the human,  
do

do the same. Putrid food is only chosen by maggots, worms, and such disgusting animals, whose senses seem the reverse of those of men. Does not this form a strong presumption, that no meats which are not perfectly fresh and untainted, ought to be eaten by men? Although Dr. Cullen disapproves of meats which are much advanced in a putrid state, he seems to think that some degree of putrefaction may be proper, as it renders them more soluble in the stomach. For it has been proved by experiments made upon animals, that putrid meats are sooner dissolved in the stomach than fresh. But it does not necessarily follow that they are sooner digested. Broth, which is a fluid and already in a state of solution, is digested slower and with more difficulty than solid meat. It is therefore very possible, that although putrid meats, from their greater softness, may be changed sooner into a fluid than fresh; yet

yet that the fresh may be sooner changed into chyle than the putrid. Besides this, the greater quickness with which any kind of food is digested, is not an absolute proof of its superior wholesomeness. If putrid meats after digestion convey something noxious into the blood, it will be but little comfort for us to know, that this was speedily accomplished. And that there is something noxious in putrid meats, seems to me extremely probable; for we know that they contain volatile alkali, which will probably be changed by the acid in the stomach into an ammoniacal salt; and as ammoniacal salts are found both in the urine and perspirable fluid, there is great reason to think them excrementitious, and consequently unwholesome.

These observations, I hope, are sufficient to prove, that although tainted meat is more soluble in the stomach than fresh, that it is not more wholesome. The  
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original disgust, indeed, which seems planted in our very nature towards even the idea of putrid meat, would be sufficient to convince me, that we ought to eat our animal food soon after it is killed. I know that this disgust can be overcome by habit, and that our feelings and our tastes may be so altered, as to make us at last prefer the fumet, or rather the stench of putrid flesh. But this is evidently an artificial and acquired preference. It is only to be considered as one example added to many, where luxury has changed the natural taste of mankind, and perverted their inclination from what is salutary, towards what is loathsome and disgusting. In the early ages, the freshest meat was preferred; and there is reason to believe, that mankind then were generally both stronger and freer from diseases. The Jewish patriarchs knew no greater delicacy to place before the stranger, who

who came within their doors, than the fat-  
ted calf newly killed. In Homer's feasts  
the guests were assembled before the boar  
was slain; and the Caledonian heroes fed  
at the feast of shells upon the red deer,  
which their arrows had pierced in the  
morning chase.

O F  
M E D I C I N E S.

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## A S T R I N G E N T S.

**T**HERE is no science, except theology, which it is of so much importance to mankind should be cleared of errors as medicine ; and there is certainly none, with the same exception, which has been deformed with so many mistakes and impositions.

This does not so much arise from the superior intricacy of those sciences, as from the great temptation to imposition which they afford.

The love of health, of life, and future happiness ; the horror of disease, death, and  
ever-

everlasting misery, are sentiments too universal to escape the observation of those who were inclined to raise their own fortune, or importance, by playing with the hopes and fears of mankind on such interesting subjects.

The great and leading quacks in religion have made so splendid a figure, that they are the objects of history, and are well known to the whole world; their aim was empire and dominion. But the most celebrated impostors in medicine are far less distinguished, as their design was only the acquisition of riches. In order to succeed in this more groveling pursuit, powerful virtues are often imputed to medicines of little efficacy; and the credulity of mankind is incessantly imposed upon by new infallible nostrums. Another cause of error, which springs from a more innocent source, is the love of forming systems.

For

For physicians have often attempted, upon the knowledge of a few disputable facts, to explain the whole animal œconomy, both in health and disease, and to demonstrate the mode of operation of an host of medicines. Dazzled by the high reputation of these system writers, their successors have credited and inculcated their doctrines, long after new facts were discovered, totally inconsistent with them.

Among the old opinions this has prevailed very much, that medicines have the same operation, and produce the same effects upon the living body, as when applied to dead animal substance.

Ardent spirits have been thought to have the power of thickening, and nitre of thinning the blood, when taken internally; because the former hastens, and the latter prevents, the coagulation of the blood when mixed with it in a porrenger.

Gums and balsams, because they possess an adhesive gluey consistence, were, till lately, believed capable of healing wounds. And however absurd it may now appear, it was thought they had this virtue, not only when applied to the part, but even when swallowed.

There is another opinion even now prevalent, and which has been supported by the authority of many celebrated writers, and among others by Dr. Cullen ; namely, that those substances which have the power of preventing the putrefaction of dead animal matter, are, for that reason, capable of curing those distempers which have been accidentally termed putrid.

If those diseases had not got that name, the epithet antiseptic would not have been so often in the mouths of physicians, and applied, as it is, to medicines of the most opposite nature.

The



The fallacious idea, that medicines act upon the living body, in the same manner as upon a piece of dead flesh, has likewise been the occasion that the name of astringents is given to a certain class of medicines, which appear to me to be devoid of that quality.

As I intend to give my reasons for disagreeing with Dr. Cullen upon this subject, I shall state, in his own words, his definition of astringents, and their mode of action\*.

“ Astringents are such substances, as,  
 “ applied to the human body, produce a  
 “ contraction and condensation in the soft  
 “ solids, and thereby increase their density  
 “ and force of cohesion.” He afterwards gives the following account of the way in which they operate †.

“ In some cases, where the substances  
 “ applied are such as coagulate the fluids  
 “ of the human body, as acids and alcohol,

\* Mat. Med. part ii. page 3.

† Page 4.

“ we can readily understand how the same  
“ should condense and contract the solids  
“ formed of the same fluids which those  
“ matters coagulate. It does not, however,  
“ appear, that other astringents void of  
“ acidity act in the same manner, and  
“ their operation must be referred to an  
“ attraction taking place between these  
“ astringents and the particles of the ani-  
“ mal solid.”

From the above quotations it appears that Dr. Cullen is of opinion, that astringents act chemically upon the living body, as they do upon the dead.

This he illustrates by the operation of tanning, or making leather.

But on reflecting on this subject with as much attention as is in my power, I cannot conceive that astringents do act upon the living body in the same manner as they do upon a dead hide. In tanning, the astringent liquor soaks through every part  
of

of the skin, and a chemical attraction takes place between the animal substance and some parts of the liquor. In consequence of this attraction some portion of the astringent liquor combines with the animal substance, and coagulates some of the juices. By this combination the hide is rendered more dense and firm, putrefaction is prevented, and the tanned leather acquires the colour and taste of the oak bark.

But apply the same astringent to the living body, nothing similar to this takes place. The liquor cannot soak into the living skin, which seems absolutely impervious; so that the astringent liquor cannot reach further than the cuticle, except by absorption. It is therefore only with the external surface of the cuticle, or with the internal coats of the lymphatics, that the astringent comes in contact; consequently it is only upon these parts that any chemical combination similar to tanning can

take place. But it is evident that this does not happen even on them; for if it did, the skin would, in some degree, resemble a tanned hide; whereas, after it is thoroughly washed, it retains not, in the slightest degree, either the colour or taste of the astringent liquor.

It appears that, as long as the powers of life continue, all chemical combination with the astringent is resisted.

Some experiments that I made convince me still further, that oak bark, which is considered as by far the most powerful of the vegetable astringents, has no power of causing any contraction of the fibres.

I made a strong decoction of this bark, and soaked one of my hands in the warm liquor for five or six minutes. After drying it thoroughly, I put each of my hands into an open-mouthed crystal bottle, and presently perceived, from the sudden dimness of the glass, that a much greater quan-

tity of perspiration came from the hand which had been in the hot astringent, than from the other. This evidently shewed, that the mouths of the perspirable vessels had been enlarged, instead of being contracted by the liquor, owing to the heat.

I tried the same thing with the astringent liquor when cold; and I likewise endeavoured to discover, whether there was any apparent difference in the degree of perspiration, when one hand was plunged into the hot decoction, and the other in plain water of the same temperature; but I could not perceive that the oak bark had the smallest power in diminishing the diameters of the perspirable vessels.

From the above observations I cannot help being convinced, that whatever powers the vegetable astringents possess when exhibited internally, they certainly never enter into any chemical combination with the substance of the body when applied

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externally,



externally, as they do when applied to a dead hide, nor cause any contraction and condensation of the fibres.

If what I have endeavoured to prove be admitted with respect to oak bark, the same reasoning applies with still more force to all the other vegetables which are named astringents; such as, the pomegranate, ash bark, &c. &c.

I do not mean here to deny that these medicines, when exhibited, may have the effect of making the solids of the body denser. I only assert, that they cannot condense and contract the solids by any attraction between such substances and the animal solids, as Dr. Cullen supposes. They appear to me to act only upon the moving fibres, as shall be explained more fully hereafter.

Among the list of Astringents, Dr. Cullen places those medicines which have a tendency to stop a diarrhoea, or occasion constipation,



stipation. In this he has followed his predecessors.

But I own I am a little surpris'd that a writer of his accurate judgment should have imitated them in this particular; for although physicians, some centuries ago, considered the intestinal canal in the light of a common pipe, and imagined that diarrhœas might proceed from a relaxation of the coats of this pipe, and that a costive habit was owing to a contraction, or shutting up of the *primæ viæ*; yet we are now certain, that constipation is usually produced by a relaxed and indolent state of the bowels, and that a diarrhœa is occasioned by violent and frequent contractions. Consequently those remedies which restrain a diarrhœa, cannot possibly do it by causing contractions in the bowels, but on the contrary act by diminishing their contractions.

All such medicines, being the reverse of astringents, ought therefore to be struck

out of that list, and placed among the sedatives.

There is another set of medicines which have no better title to this name of astringents, but which I find placed there. These which I now allude to, are such as, when applied to an inflamed part, have a tendency to diminish the inflammation. Alum, white vitriol, and the preparations of lead, are of this kind. And it is generally supposed, that they diminish inflammation by causing a contraction of the vessels. But it seems to me much more probable, that these medicines diminish inflammation simply by a sedative power, and by lessening that violent action which vessels are thrown into when in an inflamed state.

When a diluted solution of white vitriol, or sugar of lead, is thrown into an urethra affected with a virulent gonorrhœa, and when the discharge is by this means lessened, it is very evident that it is not by contracting

contracting or astringing the mouths of the secreting vessels that the injection acts, but solely by its sedative power. For it is always found, that the inflammation abates in proportion as the discharge decreases, and that, at the same time, the discharge becomes of a much thicker consistence.

From this fact of the pus becoming thicker, in consequence of the application of the above-mentioned remedies, it is evident that they act not as astringents, but, on the contrary, that the mouths of the vessels are relaxed. Otherwise, how could a discharge more gross and ropy than formerly, pass through them?

This class of medicines, therefore, in my humble opinion, ought to be struck off from the class of astringents likewise.

Iron still remains. But Dr. Cullen mentions the preparation of iron as sometimes causing an obstruction, and sometimes an overflow of the menses, which seems inconsistent

sistent with its claim to the title of Astringent, although it may leave it a just claim to that of a Tonic.

On the whole, I am much inclined to think, that all those Medicines which are called Astringents, may be proved to have no Astringent quality on the human body; and that, properly speaking, there are no such things as astringent Medicines.

I do not mean however to say, that there are not remedies which ultimately have the effect of producing more rigid fibres in delicate habits; but these are all tonics, which create appetite, and augment the powers of the stomach. This naturally produces an increase of nourishment, by which the solid parts of the body are rendered denser and stronger.

## O F T O N I C S.

**T**HIS class of Medicines consists of those substances which have the property of restoring strength to a weakened body.

It is not to be conceived, however, that there are any set of Medicines which can add strength to a body in perfect health. If there were such, a man, by continuing to use them, might acquire more and more strength during the whole of his life, which we know cannot be done. All that is ever accomplished by Tonics, is to restore strength to those who are enfeebled by disease.

It may be said, that, according to this explanation, all Medicines whatever are Tonics, because they all are supposed to contribute to the removal of disease, and of course ultimately to restore strength. But the term Tonic is never applied to any substance which occasions any evacuation, or  
causes



causes any degree of weakness during its operation. It is confined to such as restore strength and vigour to an enfeebled body, without causing any previous debilitating effect whatever.

Dr. Cullen is of opinion, that this increase of strength is given to the fibres in two ways. The first is, by condensing the solids, which effect is produced by Astringents. The second way of increasing the powers of the body is, by inducing that state of the nervous fluid upon which their tone depends, and therefore are named Tonics.

I have endeavoured to prove, that those Medicines which are named Astringents do not condense the fibres, and, in short, that that there are no such Medicines as Astringents.

Tonics, which are the class of Medicines now to be considered, Dr. Cullen imagines act in the second way: that is, upon the nervous fluid, or the inherent power, as he  
names



names it, and produce there a state of tone, which state is communicated from the stomach to all the parts of the system.

This I take to be the Doctor's theory of the action of Tonics, which action, he imagines, bitters alone can excite.

The Doctor proceeds to explain the action of bitters in the following words \*.

“ The most obvious operation of bitters  
“ is, that, being taken into the stomach,  
“ they increase the appetite for food, and  
“ promote the digestion of it. But we take  
“ it for granted, that these functions de-  
“ pend upon the tone of the muscular  
“ fibres of the stomach, and therefore may  
“ suppose that the improvement of these  
“ functions depends upon an increase of  
“ the tone in these fibres. And farther, as  
“ loss of appetite and indigestion can often  
“ be distinctly perceived to occur from a  
“ loss of tone in the stomach; so bitters,

\* *Materia Medica*, vol. ii. p. 57.

“ as

“ as they are often effectual in curing those  
“ disorders, may be presumed to do it by  
“ restoring the tone of the organ.”

The fact which is stated in the above quotation, that bitters increase appetite, and promote digestion, is undoubted; and the opinion which is given of their manner of operating arose naturally enough from observing, that when the muscles of the legs or arm are weakened by whatever cause, there is a proportional weakness in the action of those members. In like manner, when the function of digestion was found to be impaired, this was supposed to proceed from a weakness or relaxation of the fibres of the muscular coat of the stomach.

But this analogy cannot apply, since it has been discovered, by a more intimate knowledge of the human frame, that digestion is not performed by the muscular exertion of the stomach, but principally  
by

by a peculiar juice which is secreted by its villous or internal coat. And therefore it is most probable, that weak digestion, or the disease named *dyspepsia*, is owing to the gastric liquor being secreted either of a bad quality, or not in sufficient quantity, and entirely independent of the muscular coat of the stomach; the use of which coat is simply to assist in expelling or protruding the contents of the stomach.

But if we were to admit that *dyspepsia*, or any symptoms of indigestion, is owing to want of tone in any part of the stomach, it would be more likely that this weakness lay in the vessels which secrete the gastric juice. We are, however, too little acquainted with the nature of secretion, to be able to assert, that every imperfection in the gastric juice is occasioned by a want of tone in the secreting vessels. It must, I think, often proceed from other causes. For complaints of indigestion often trouble

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persons

persons of a very stout habit of body, and in whom there is no appearance of a relaxation of their muscular fibres, but the contrary; for such complaints occur chiefly to persons of the Melancholic Temperament; in which Temperament Dr. Cullen observes, that the solids are firm and dense, and the strength considerable.

Although therefore it seems probable that there is some other cause for dyspepsia than simply want of tone, yet this disease cannot continue long without occasioning general weakness. For if the stomach does not digest, and throw into the blood fresh supplies of chyle, the body must soon become enfeebled and emaciated.

It appears therefore, that the effect has been mistaken for the cause. And it is not want of tone that causes indigestion, but indigestion which in time occasions want of tone.

It

It is fortunate, however, that whatever is the cause of dyspepsia, the exhibition of bitters has often the effect of exciting a good appetite, and promoting digestion. And it seems not unnatural to imagine, that this effect of bitters arises from their being endowed with the power of exciting a secretion of gastric juice, not only in greater quantity, but also of a better quality.

Dr. Cullen imagines, that bitters give to the stomach a state of tone which is communicated to all parts of the body by nervous interposition. Here the Doctor seems to have overlooked an important circumstance; namely, that, by the improvement of digestion, plenty of good chyle is formed, the blood is enriched, and diffused in plenty to the muscles, brain, nerves, and all parts of the system. This addition of Aliment must of course be the source of tone or strength to the whole body, and to the



stomach itself, whence the supply originally proceeded.

The action by which bitters excite an abundant secretion of the gastric juice in the stomach, is similar to that of a stimulant; and there are many cordials and stimulants which have the effect of relieving indigestion as well as bitters. Wine and vinous spirits, spices, and mustard, have all the effect of occasioning a quicker digestion. These substances have no power of quickening the dissolution of the food in the stomach, but must act by improving the secretion of the gastric juice; and the cordials have the power of lessening the irritability and uneasiness which often take place in the stomachs of dyspeptic patients.

Although both vinous liquors and bitters have the property of quickening digestion, yet there is this difference in their action. The vinous liquors act instantaneously, not only on the stomach, but their  
cordial



cordial effects extend immediately to the whole nervous system. Bitters, on the other hand, act more slowly, they produce but little excitement through the general nervous system; but they stimulate very considerably the secreting surface, and nerves of the stomach, with which they come into contact.

Vinous liquors therefore promote digestion best, if swallowed immediately after our food; whereas bitters shew their effect most strikingly, if taken an hour or two before. Both these substances, together with various aromatics, are sometimes successfully administered in conjunction, in order to augment their powers. And to some patients troubled with indigestion, one composition is found beneficial, and to others another. For in this complaint, owing to the irritability of the stomach, there is often the greatest diversity in the effects of medicines, and even of food. Bitters, in

some form or other, however, usually give relief. But it need not be wondered at that they do not always cure. For although they usually excite the secretion of a better gastric juice, yet they have probably no power to remove the cause of the dyspepsia. And if the cause continue, although bitters may palliate the symptoms, yet they will not extinguish the disease: and when they are continued for a great length of time, they are apt to injure the digestive powers.

Dr. Cullen has observed this fact, and seems at a great loss how to account for it: for it appears a paradox, that the use of the most powerful Tonics for a length of time should occasion a total want of tone in the stomach; and he has thrown out a conjecture, that they possess some narcotic or deleterious quality which injures the stomach.

By

By the manner in which he mentions this, he seems aware of the objections which naturally arise to the supposition. For if we once admit, that a medicine can possess opposite powers in the same circumstances, all medical reasoning is at an end. The difficulty is only produced by the word Tonic. If it is supposed that a bitter actually gives strength to the stomach, then it is impossible to conceive that the continued exhibition of bitters should produce weakness there. But if we consider, as I have endeavoured to shew, that bitters are only stimulants to the secreting vessels and nerves of the stomach, then it is natural to expect, that the daily use of this stimulant will prove detrimental at last; not from any deleterious quality in the bitters, but simply from the general law of the animal œconomy, that when a stimulus is frequently applied to a part to excite it to do its office, this stimulus, or a greater one, at

length becomes requisite in order to the due performance of that office.

It is therefore proper in the exhibition of bitters, not to continue them for too long a time. If after prescribing them for a certain period some benefit is procured, they ought to be disused for some time at least; during which the patient should use diet of the easiest digestion, take regular exercise in an open and salutary air, and afterwards resume the use of the bitters. By this means he will gain the full benefit of the medicine, without injuring his stomach by the continual use of a stimulus.

Besides the quality of exciting appetite, and strengthening the digestive powers, bitters have another remarkable one upon the system in general, which renders them eminently useful in intermittents, typhus fevers, mortifications, and various other diseases.

This

This seems to proceed from the same power as the former, that of stimulating or exciting.

By stimulating the secreting vessels in the stomach, bitters are useful in dyspepsia; and by exciting the nervous system, and consequently the vascular, they are useful in the other diseases which were above mentioned.

Dr. Cullen has observed\*, that, in the cure of intermittents, “ bitters do not act as stimulants, for they do not increase the frequency of the pulse, nor the force of the circulation; nor do they act as astringents, because they do not always possess any such quality; and therefore that, in such cases, they must act purely as Tonics.”

I do not wish to object to words. Only here I must observe, that when the medicine acts as a Tonic, I consider it acting as

\* Cullen's *Materia Medica*, vol. ii. p. 59.

a stimu-



a stimulant. Because it seems to me, that it is in stimulating the moving fibres that its Tonic power resides. And although it may be in general true, that bitters do not increase the frequency of the pulse, I cannot help thinking that they do increase the *force* of the circulation. And when Dr. Cullen denies this, he probably only considered the exhibition of bitters in intermittents, where, in the intervals, the pulse being naturally good, any increase of its strength is not easily perceived. But, as the use of bitters prevents the weakness and feebleness of the heart's action in the cold fit of intermittents, this, in my opinion, is equivalent to increasing its force. I must then think that a large dose of bark, columbo root, chamemile, or any other bitter, does augment the force of the circulation. This is perceived soon after they are swallowed; and that degree of heat which is immediately



ately felt in the stomach, confirms me in my opinion.

The excitement thus suddenly made proves, that the bitters act directly on the nerves of the stomach. The stimulus is communicated to the brain and the whole nervous system, by which means the heart and arteries are excited to stronger, though perhaps less frequent, contraction.

It is no objection to this idea of a stimulus, that the action of the heart becomes less frequent, at the same time that it is stronger; because this is common to wine, all the cordials, and many other stimulants.

When the pulse is extremely weak, it generally becomes at the same time frequent. A medicine therefore, which excites the force of the pulse, often lessens its frequency, as appears remarkably in the typhus fever, and in mortifications from debility.

It

It seems then probable, that it is by their stimulating power that bitters are of use ; but in what way it is that they act upon nerves and moving fibres, and cause this excitement, is utterly unknown, and is perhaps beyond the reach of human knowledge.

The nature of the nervous power, how it operates, by what means it is excited or depressed, are questions involved in the greatest obscurity. Into whatever path of science we enter, although we advance some way with tolerable smoothness, we always at last meet with some unsurmountable obstacle, which abruptly interrupts our progress, and prevents our reaching the wished-for goal.

It is not to bitters alone that the observations I have made, apply ; but likewise to a great number of those substances which Dr. Cullen has named astringents, particularly

larly to iron, the ash, oak and pomegranate barks, logwood, acacia, uva ursa, &c.

Iron, in particular, I consider as one of the most powerful of the Tonics. It acts upon the nerves and secreting powers of the stomach, improves the digestion, increases the force of the heart, and invigorates the whole system.

Dr. Cullen prefers the rust of iron to the filings in a metallic state; and the rust is what is generally prescribed in this country. But understanding that foreigners, particularly the Italians, almost always employ the filings unruined, I was induced to try them; and I am strongly persuaded that they are greatly preferable. The calx or rust of iron, like some other metallic calces, seems to me much more inert than the pure metal; and this is confirmed by its having sometimes been given in very large doses, without producing any effect. But the filings made very fine, and ground well in an  
I iron

iron mortar, are much more active. When they disagree with the bowels, some warm aromatic should be joined with them.

There is a power which has often been ascribed to bitters, but which Dr. Cullen has with great propriety slighted ; namely, that of resolving visceral obstructions.

Visceral obstructions is one of those vague expressions so frequently used by one set of medical practitioners, to convey to their patients an impression of their knowledge, when conscious of having no distinct idea of the disease ; and sometimes it happens, that the practitioner, as well as the patient, is the dupe of such general expressions.

We often hear in conversation, and have accounts in books, of obstructions of the liver, of the spleen, of the mesentary, and other internal parts ; and are informed, at the same time, of a vast number of medicines endowed with the power of curing these

these obstructions, under the title of deobstruents, resolvents, and alteratives.

But the term obstruction is so very general, and includes so many different kinds of diseases, that, without a more precise knowledge of the nature of the distemper, no medicine can be prescribed on any rational ground.

If an obstruction in the liver, for example, is caused by an inflammation in that viscus, would any one recommend bark or gentian, or would any one employ these medicines if the obstruction was occasioned by a gall stone? Certainly not; there are powerful means of alleviating these complaints, which would be aggravated by bitters. Neither can it be expected, that where an obstruction proceeds from schirrus, that bitters will resolve it; because when a schirrus occurs in an external part, where, from its coming under the cognizance of our senses, there is no doubt of the disease,  
it



it has never been observed that the schirrus was dissolved by the use of bitters. On the whole, it seems improper, and may lead to dangerous practice, to assert, that bitters, or indeed any class of medicines, can remove obstructions in the viscera, without ascertaining the precise nature of the obstruction.

There is indeed one species of obstruction, and one only, which bitters sometimes relieve, and that is costiveness; for when given in a large dose they often prove laxative. But there are so many other more certain remedies for this kind of obstruction, that few practitioners will choose to depend on bitters.

The last disease which I shall take notice of, for which bitters are given, is worms.

The species which is most frequent and dangerous in this country, is the ascarides, or small white worm. This kind occurs pretty often, and sometimes in an astonishing



ing degree, and produces the most alarming and fatal symptoms.

Physicians have endeavoured to remove them, either by exhibiting such remedies as would poison them, or such as would purge them off.

The first plan cannot be put in execution with safety ; because whatever is of such a noxious nature as to kill the worms, might also prove detrimental to the patient. And besides, what would prove fatal to those animals, if applied directly to them, might be rendered innocent by the powers of digestion before it reached them.

Purgatives are given upon more rational grounds ; for it is often found, that a brisk purgative will expel a prodigious number of worms.

But the practice of purging has likewise many objections ; because it cannot be expected to carry off all the worms, and if any are left, they quickly increase again.

Purgatives likewise weaken the patient, who is already in a weakened state from the disease.

Both these modes of practice being so objectionable, some other is highly to be wished for. In our researches for this, we will be greatly assisted by considering what is the probable cause of the existence of those animals in the human body.

We may remark then, in the first place, that worms are most frequent in children, and never in them when at the breast.

Secondly, They are observed most frequently among females, or children of a weakly frame, and never among grown-up persons, except in such as have a weak digestion. It can hardly be doubted, but that the eggs of these worms are swallowed with our food. It seems therefore probable, that in those persons who are in perfect health, and whose digestive powers are vigorous, the ova are either dissolved, or

entirely destroyed by the gastric juice. But in infants and grown persons whose organs of digestion are weak, the ova not being thus digested, or destroyed, the intestines form a proper nidus for them, where they are hatched, and the animals multiplied.

Their appearance is therefore explained by supposing some debility in the organs of digestion. By debility, I mean some defect or disease. For although it seems probable that there are many different causes producing indigestion, these are little known, and they are all united under the name of weakness, or debility.

From this explanation of the cause of worms, it will appear, that the purging plan is little adapted to produce a complete cure. For although the whole worms were swept from the bowels by one dose, (which never happens,) yet the original defect continuing, or being increased by the purge; they will return in as great number as before in a short time.

The exhibition of tonics, the use of the cold bath, proper exercise, and easily-digested food, is the regimen best adapted to improve the digestive organs of the patient, to strengthen him generally, and therefore to cure the disease. Bitters, therefore, have been found useful against worms by their tonic powers, and not by their power of poisoning the animal, as has been supposed; and bark is perhaps the best of all worm powders. But where it does not succeed, some of the more intense bitters may be tried. During a course of bitters, a purgative may be occasionally exhibited in order to expel a number of them at once, and to occasion an immediate abatement of the distressing symptoms which the worms sometimes produce.

The *pulvis e scammonio c. calomelane*, is excellent for this purpose. The smallness of its bulk makes it exceedingly convenient for children; it is very effective, and perhaps

haps the calomel is useful from its stimulating, as well as from its purgative power.

I am a good deal surpris'd to find, that Dr. Cullen has entirely omitted tin from his *Materia Medica*. It is a very ancient medicine, and still retained in both the London and Edinburgh Dispensatories. It has been principally celebrated as an anthelmintic, which it owes to its being a tonic. It is certainly, however, a much weaker one, than those already mentioned, although its being insipid, and easily taken by children, occasions its being frequently prescribed.

## REFRIGERANTS.

IN so large a work as that of Dr. Cullen, and upon so difficult a subject, it is not in human nature to avoid falling into errors. I have endeavoured to point out some which struck me. But in perusing the work in question, I hope I shall not be considered as having searched with malignant attention to detect accidental or trifling mistakes, in order to expose them to the public eye, and lessen the high reputation which Dr. Cullen has justly acquired. Critics are apt to be considered as the enemies of the authors they comment upon; but this is so far from being my case, that I have the greatest veneration for Dr. Cullen, as I am sensible that few have done more towards the advancement of the science of medicine. But this science is not like mathematics, whose data are self-evident,



dent, and whose reasonings are certain. It is on the contrary the reproach of medicine to resemble metaphysics, and where the arguments are only of a probable kind, or where the reasoning is founded only upon probability, the conclusions will sometimes be contrary to truth. It is obvious that an error in medicine leads to far more serious consequences than one in metaphysics. The latter science excites, perhaps, the greatest stretch of thought that human intellects are capable of making. It is often the exercise, the ornament, and delight of strong minds to search into the origin of ideas, and to discover the nature of time, space, power, and a thousand abstract questions. An error in such investigations, only exposes a metaphysician to be refuted by another, and is of little importance to mankind. Not so are errors in medicine; the professors of this art attempt to alleviate or remove pain and diseases; but the consequences of

a mistake sometimes do not simply occasion a failure in these intentions. Fortunately, however, different theories do not always lead to a different practice. Two physicians, for example, may prescribe antimony for two patients with fevers; the one with the design of expelling morbid matter, and the other to remove spasm. Possibly the antimony does neither the one nor the other, yet it may have the effect, by some means or other, of restoring both the patients to health. But those who on this account pretend to despise all theoretical reasoning, are exceedingly in the wrong. For theories do in a very considerable degree affect our practice. No rational man can prescribe, without expecting that his prescription is to produce some effect; and this effect he imagines is by a particular means to remove or alleviate the disease. This reasoning is a theory, and indeed it seems impossible for a man who can think,  
not

not to have a theory. It is therefore of the utmost importance to have the just one; for although a useful medicine may be ordered upon a bad theory, yet it is hardly possible to prescribe wrong upon the true one; but the true one is extremely difficult to discover. We are, therefore, not blindly to receive the theories of any man. It is by canvassing and examining opinions and systems, that the art of medicine is to be improved, and Dr. Cullen's work, being an able and standard work, is, on that account, a proper subject for criticism.

We shall now consider REFRIGERANTS.

THE medicines to which Dr. Cullen has given this title are acids, the neutral salts, and a few other saline substances.

The fixt Alkalis seem to me Refrigerants, as well as the acids, although they are not considered as such by Dr. Cullen, and the benefit arising from their use in calculous cases confirms this; for it is plain, that  
nothing

nothing of a heating nature could give relief in these painful and inflammatory complaints; but the urinous taste of fixed alkalis renders them very disagreeable, and prevents their being employed as Refrigerants.

If both acids and fixed alkalis are refrigerants, it is natural to expect that all neutrals should be so likewise. Dr. Cullen makes an exception of sea salt, which I own I do not see sufficient grounds for. When sea water is given in a considerable dose, it proves a purgative and diuretic, and cools the body like the other neutrals: and the stimulating powers which sea salt sometimes shews, are common to it with all the other refrigerants, as will be taken notice of afterwards.

Refrigerants derive their name from their diminishing the heat of the body.

Some persons observing that many salts generate cold in the act of dissolving, have  
imagined

imagined that this affords a satisfactory explanation of the refrigerating powers of neutral salts in the living body. The absurdity of this opinion is clearly proved by Dr. Cullen ; but he inclines to credit another theory, which, however ingenious and plausible, I fear is erroneous. It is founded upon a system invented by Turberville Needham.

This gentleman was no physician, and had no intention of applying his notion concerning the general properties of animal and vegetable substances to the particular purpose to which Dr. Cullen applies it. But indeed the Doctor seems hardly to credit his own theory, and even states a strong objection to it. If any one chooses to examine this matter, he may observe, that upon the same principle that saline substances are considered as refrigerants, wine, ardent spirits, essential oils, and hot spices, have an equal claim, being as strong anti-

zymics

zymics as salts. Since this system leads to such conclusions, it must be given up.

In a former part of this work, I endeavoured to shew the mistakes that naturally arise from judging of the actions of medicines on the living body, by considering their powers on inanimate substances; we may be drawn into equal errors by another practice, too much in use.

When men endeavour to account for the manner in which a medicine operates, they begin by supposing a cause; and from this hypothetical cause, they deduce what consequence suits their purpose; and, by a small share of ingenuity, give plausible answers to most objections.

What appears to me the best way of ascertaining the manner in which a medicine operates, is, in the first place, to observe the ultimate effect, and then to go back, step by step, as far as possible, to the primary cause. The first cause, in no instance,



stance, was ever discovered; but in tracing secondary causes, we may go a certain length with tolerable certainty.

Agreeably to this plan, let us establish what the effects of Refrigerants upon the living body are.

It is agreed on, by the best writers, that they possess the following powers:

1st, They tend to diminish the heat of the body, when above the natural temperature.

2dly, Acids, and some others of this class, besides their cooling effect, increase appetite and the power of digestion.

3dly, They are cooling purgatives.

4thly, They are diuretics.

Many other virtues are attributed to this class of medicines without foundation.

To prevent confusion, let us treat of these properties separately.

The first effect is, that of diminishing the increased temperature of the body.

Dr.

Dr. Cullen has clearly shewn, that Refrigerants do not act like ice, or other cold bodies, simply by producing cold. They must therefore act by diminishing the cause of heat ; there is no other alternative. Whatever is the immediate cause of heat in the human body, the circulation of the blood is certainly the source of it ; and the heat of the body is always in proportion to the strength and velocity of the circulation ; nothing can diminish the temperature of the body, which does not at the same time lessen the violence of the circulation, except the application of actual cold.

The exhibition of Refrigerants accordingly occasions a decrease of the force of the action of the heart and vessels, and at the same time a diminution of the temperature of the body ; and the latter effect seems only a consequence of the former.

Having

Having advanced thus far, the next thing to be inquired into is, how these Medicines are enabled to diminish the action of the heat and vessels.

In scrutinizing this, it will be observed, that the heart, and the great blood vessels, are excited to act from the nervous influence derived from the brain. It therefore follows of necessity, that Refrigerants must operate through the medium of the brain, and as their action is sudden, and long before the medicine can have been absorbed and conveyed into the blood, they can only influence the brain by means of the nerves of the stomach.

It seems, in fine, demonstrable, that the first action of the Refrigerants is produced by some impression upon the nerves of the stomach conveyed to the brain; which impression occasions a diminution of the nervous influence sent to the heart and vessels; consequently the force of the circulation

tion is decreased, and the heat of the body lessened.

When we try to push our researches still farther, and to inquire, what is the nature of the action of Refrigerants upon the extremities of the nerves, or the change that takes place in the brain, to these questions no satisfactory answer can be given. The brain and nerves form the limits of almost all our investigation into the causes of the powers of medicines, and they are a *bourne* which no one has hitherto passed.

The second effect of this class of Medicine, is that of increasing the digestive powers. A good appetite, and the ready digestion of food, as was mentioned above, only take place in persons whose stomachs secrete a proper gastric juice.

Imperfect digestion and want of appetite are generally occasioned, either by a deficiency in the quantity, or some imperfection in the quality of this juice.

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In such cases, the exhibition of certain medicines of a sharp or acrid nature, seems to have the effect of exciting the vessels in the internal coat of the stomach to form a good secretion, and in due quantity.

This corresponds to what surgeons observe frequently in ill-conditioned sores, where the application of a stimulant increases the discharge, and changes the bad kind of pus to a good.

It seems probable, that it is on this principle that acids improve digestion. They ought therefore, when given for this purpose, not to be too much diluted, because when they are, the quantity of diluting liquor will tend to embarrass rather than stimulate the stomach. Alkalies perhaps have never been given directly to promote digestion, yet when given for other purposes, they have sometimes been observed to have that effect.

Of the neutrals, the sea salt has been distinguished as the most powerful for increasing digestion, which I am apt to think is only owing to this salt being used in a solid form, or little diluted ; for, when nitre is made use of to preserve meats, they have been found as light and of as easy digestion as meats preserved with common salt. And it is not improbable that many, if not all the neutral salts, would have, in some degree, the same effect.

With regard to the diuretic and purgative effects of many of the saline substances, they cannot with propriety be treated of in this place. I shall only observe, that those substances, when acting as tonics or diuretics, or purgatives, derive their power from a stimulating quality ; yet the stimulus in all those instances is local, only exciting the parts with which they are in immediate contact. And their action upon the body in  
general



general is cooling and sedative ; they are therefore very properly classed by Dr. Cullen, under the title of *Refrigerantia*.

Saline substances have been celebrated for their diaphoretic powers also ; but so far from possessing any such quality, I am greatly mistaken if they have not an effect directly opposite.

It seems to me an absolute impossibility, that the same medicine should have the power of lessening the force of the circulation and cooling the body, and should likewise have the power of producing a diaphoresis ; for sweating is to be excited by increasing the force of the circulation, and heating the body. This opinion is not formed solely from reasoning, but from experience. For I have observed, that very large doses of nitre, and the other Refrigerants, have not the smallest tendency to excite sweating, when the body is kept in the usual temperature ; but if the patient is

kept extremely hot, and large quantities of drink are given him, some sweating may break out, even although Refrigerants are also given, which medicines appear to me always to have a tendency to check the sweating.

OF DILUENTS, ATTENUENTS, INSPISSENTS,  
DEMULCENTS, ANTACIDS, ANTALKALINES,  
AND ANTISEPTICS.

MEN who indulge themselves in speculations, without examining into the truth of facts, continually fall into errors. The human understanding is little able to reason *a priori*. Physicians, however, through indolence, have often ventured to raise systems upon speculation only, not chusing to take the trouble of making experiments. These systems, invented by men of distinguished talents, have sometimes descended through ages, without any one being hardy enough to question them. The present age, however, is of a more daring disposition. It is not in medicine alone that men look with sharpened eyes to examine the truth of old opinions. They are not now prevented by

any superstitious veneration for antiquity, from searching into their origin, examining the arguments upon which they are founded, and bringing the whole to the test of experiment.

That the doctrines of the seven classes of Medicines mentioned at the head of this chapter, were founded upon speculation, and not upon observation, seems to me obvious. As the human body consists of solids and fluids, it was natural enough for a physician who wrote upon diseases, to divide them into those of the solids and those of the fluids. When he came to the latter, it was equally natural to think that they were sometimes too thick, and sometimes too thin: and whether they were the one or the other, that they sometimes became acrid, or had acrimonious substances mingled with them. And if the theorist was a chemist, and of course often thinking of acids and alkalies, it would be difficult for  
him

him to avoid suspecting that the fluids partook of those qualities, and that to their prevalence many diseases were owing: and if the writer happened to turn his attention to what takes place in dead animal substances by the progress of putrefaction, he might think that something of the same kind occasionally happened to the fluids in the living body.

After a pathologist had once imagined the possibility of all those varieties, and found that the whole formed a round and regular system, he first became convinced himself, and then attempted to convince others, that the blood, being too thick or too thin, becoming acrid, acid, alkalescent, or putrid, formed the causes of a great variety of diseases.

After having settled that our fluids are disordered from all those different causes, it was next attempted to find out remedies adapted to each. When the fluids were

supposed to be too thick, the physician was not contented with the obvious plan of dilution ; he sought for what are called *incidentia* or *attenuentia* ; that is, remedies which have the wonderful property of separating and cutting the primitive particles of the fluids to pieces. And as it was observed that alkalies and neutral salts, when mingled with recent blood, prevent its coagulation, it was imagined that these substances possessed the properties which were wanted ; and they were accordingly dignified with the titles of *Attenuentia* and *Incidentia* ; and the same powers were bestowed upon a thousand other medicines, for what reason, I believe, nobody can now tell.

When it was likewise discovered, that acids and ardent spirits hasten the coagulation of some of the animal fluids, it was immediately asserted, that those substances were capable of correcting the fluids  
when



when too thin; and the name of the *In-spissentia* was given them.

To correct acrimony in the fluids, oils and mucilages were recommended; as if these mild and viscid substances could obtund and involve the acrid particles of the blood, in the same manner that oil of olives and the yolk of an egg lessen the sharp taste of vinegar, when mixed together, to form sauce for a salad. Upon this, or some similar reasons, were expressed oils, gum Arabic, isinglass, starch, and a variety of other mucilaginous substances, named *Demulcentia*.

When the fluids were supposed to be too acid, alkalies of course were prescribed; and when the fluids were in the opposite state, acids were the remedy. In this manner *Antacida* and *Antalkalina* became important classes of Medicines.

To prevent and remedy that state of the fluids in which they were supposed to have a tendency

tendency to putrefaction, every substance was recommended which had the power of stopping or preserving dead animal matter from putrefaction; and as this power is found to reside in a great variety of medicines, a most numerous list of Antiseptics occurred of course. Some of the systems formed on this kind of reasoning, and on such observations, were so much admired for their ingenuity, that their inventors acquired the highest reputation in medicine.

But more accurate observations and experiments have shewn, that no just idea of the nature of diseases, or of the action of medicines on the living body, can be formed from any analogy, to what takes place in dead animal matter.

Dr. Cullen has ably refuted most of the above opinions, but he does not give them all up.

He

He takes notice of an argument in favour of the demulcent quality of oil, namely, “ That when an acrimony, in consequence of certain diseases, prevails in the mass of blood, an absorption of the oil, which has been formerly laid up in the adipose membrane, takes place ; and it is with great probability supposed, that in this, Nature intends that the absorbed oil should cover the prevailing acrimony \*.”

Dr. Cullen thinks this reasoning probable, but he doubts if exhibiting oil would have the same effect. I own that I cannot think the argument a good one ; for it seems to me much more natural to suppose, that the fat is absorbed, in order to furnish a supply to the blood, impoverished by a weakening disease, than that it is intended to sheath any acrid or acrimonious particles ; especially as the same absorption of fat takes place in the rheumatism, dropsy, and several other

• Cullen’s Mat. Med. part ii. p. 411.

diseases,

diseases, where no one ever suspected the existence of any acrimony ; besides this, it is not the fat alone which is absorbed, but the muscles and flesh of every kind, which are certainly not capable of sheathing acrimony, or possessing any Demulcent quality.

There is not then good reason for believing, that those Medicines called Demulcents have any power of sheathing acrimony in the blood ; but Dr. Cullen thinks, that the relief which they give in coughs, is owing to their sheathing acrimony out of the blood. His words are \*, “ As coughing is ordinarily excited by a halitus, or vapour, of some acrimony arising from the lungs, and irritating the very sensible parts of the glottis and its neighbourhood, so, by besmearing these parts with a Demulcent matter, we may often avoid the irritation

\* Cullen's *Materia Medica*, part ii. p. 412.

“ we

“ we speak of, and therefore the frequency  
“ of coughing.”

It is a fact acknowledged by almost every one that has had a cough, that swallowing sweet, oily, and mucilaginous substances, often lessens the frequency of the fits of coughing : but there are strong objections to Dr. Cullen’s explanation of this matter. For there is little reason to suspect that there is any acrid halitus, or vapour, which excites the cough, as the phlegm or mucus of the lungs appears to be equally bland, and free from acrimony, with the Demulcents.

Any extravasated substance in the lungs, however mild it may be, causes coughing ; mucus, pus, or blood have all this effect, and indeed, if a small portion of any of the fluids which are named Demulcents should by accident get into the trachea, a very violent fit of coughing would immediately take place.

The lungs are fabricated for the admission of air only, and are endowed with so  
much



much sensibility, that they are irritated by the contact of any other substance; even the mucus which is secreted by the bronchial vessels and cells has this effect, when a larger quantity is formed than is necessary to keep their internal surfaces moist.

But it is very curious, that when any substance irritates the lungs, the sensation is always felt in the glottis, even though the irritating substance should be situated in the most remote cells of the bronchia. There are several other instances in the animal œconomy, where the sensation is perceived in a different part from that where the impression is made.

The tickling which is felt in the glottis before coughing, is not therefore owing to any acrid halitus irritating that part, but to some extraneous substance irritating the lungs, whose nerves are so arranged, or constituted, that the sensation is referred to the  
glottis,



glottis, instead of being referred to the part where the irritation is made.

If these opinions are well founded, and if coughing is not produced by any acrid halitus arising from the lungs, it is then clear that Demulcents cannot act by sheathing the glottis, and defending it from acrid vapour.

Demulcents seem to me to relieve coughing, from a well known principle in the animal œconomy; namely, that exciting one sensation lessens or removes another. When a man swallows slowly some saccharine or mucilaginous substance, his attention is so much taken up by its taste, that he does not feel a slight irritation in the trachea. If, however, the irritation in the trachea increases, a cough is at last excited. For these substances have not the power of entirely stopping the cough, but only that of diminishing its frequency. Neither do they possess this power in a  
greater

greater degree than salt, or any substance equally sapid. But saccharine substances, being both more agreeable to the taste and more wholesome, are generally preferred.

In confirmation of this, I have frequently observed, that persons that are afflicted with very severe coughs, are seldom much troubled while they are eating or drinking.

In fine, there is no proof that there are any Medicines which have the virtues of sheathing acrimony, or in other words, there are no Demulcents.

We next come to Antiseptics.

Under this title, Dr. Cullen arranges a set of Medicines, whose powers upon the living body are different, and even opposite to each other.

This list, however it appears, was made in consequence of experiments tried with substances upon dead animal matter ; a me-

thod which infallibly leads to error: because the effects which substances have upon dead animal matter, is different from that which they have when applied to a living body. Medicines exhibited to living men ought to be classed according to their effects on the living only, and not according to any effect they have on the dead. By the contrary method, a most heterogeneous jumble of different substances and medicines of opposite powers are arranged under the same class. For medicines, some of which have a Sedative, some a Refrigerant, some a Stimulant, and others a Tonic effect on the living animal body, are all found, when applied to dead animal substances, to preserve them from putrefaction. And although a person of Dr. Cullen's experience would probably not be misled in his practice by this circumstance, yet there are practitioners who might.

For example, the sea scurvy is named a putrid disease, and sea salt, in consequence

of possessing the quality of preventing dead flesh from spoiling, is termed an Antiseptic. But if an inexperienced practitioner, misled by the terms given to the disease and to the salt, should exhibit it in that melancholy complaint, I need not say what the effect would probably be. It is well known, that fresh vegetables of almost every kind, produce an immediate favourable change in the symptoms, and generally cure the disease, although they have either no Antiseptic powers at all, or insignificant ones, when compared to those of salt.

In those fevers which have been termed putrid, the greatest number of the Antiseptics would be detrimental. Suppose, for example, a physician prescribed in a typhus fever, large doses of caustic or mild alkali, sea salt, or sugar of lead; I know not whether those medicines would have any effect in stopping the putrid tendency of the fluids; but no one can doubt of their  
putting

putting a speedy period to the patient's existence.

This is sufficient to shew, how improper it is to apply the term *putrid* to diseases, and *antiseptic* to medicines.

I shall say nothing of the dispute here concerning the putrescency of the fluids. In a former part of this treatise, I have said, that I consider this as a mere disagreement on words. Certain it is, that in the scurvy and typhus fever, the state of the blood is changed ; and if any one chuses to call this change putrescency, he may, it is of little importance. But if he afterwards names a set of medicines antiseptics, and infers that because they have the power of preventing the putrefaction of dead animal matter, that therefore they have the power of curing these diseases, the consequences would be lamentable.

The class of antiseptics being avowedly taken from the action of substances upon

dead animal matter, the term is proper for chemical purposes, but much the reverse when applied to medical ones.

And what is singular, is that, even when the whole class of antiseptics is rejected, not one medicine will be lost to the *Materia Medica*, all of them being to be found under some other title.



## N A R C O T I C S.

WE are now to consider one of the most beneficial classes of medicines that has yet been discovered. For we are enabled by Narcotics to calm and relieve the pain to which mankind are exposed from so many different sources; and this class of medicines is endowed with the power, not only of soothing the torments of the body, but in some cases those of the mind also.

For although Physicians are not able to

- “ Pluck from the memory a rooted sorrow;
- “ Raze out the written troubles of the brain;
- “ Cleanse the foul bosom of that perilous stuff,
- “ Which weighs upon the heart;”

yet by the aid of a sweet oblivious antidote, they have it in their power sometimes to diminish the violent emotions produced by anguish, and frequently to give temporary relief, by composing the distracted senses into a forgetful slumber.

Although the benefit accruing to mankind from Narcotics is assuredly very great, yet like every other efficacious medicine, they may, by improper use, or by being given in too great a quantity, also do harm. On this account a violent prejudice is entertained by many persons against opium, which is by far the chief of this class. Some carry their prejudice the length of considering it as a poison, and to refuse to take it in any case whatever. When administered improperly, no doubt it may kill the patient; but when given judiciously, it proves mortal only to the disease.

When a man is in perfect health, he will act wisely in swallowing nothing but wholesome food; but when he is attacked by disease, his usual food he frequently cannot swallow, and it would do him harm if he could. Another regimen is then generally expedient, and such medicines are necessary as would be hurtful to him in health,

health, and would even kill him if given in too large doses. So that opium is, in this particular, on a foot with every other useful medicine.

Much praise is due to Dr. Cullen for endeavouring to remove the prejudice against opium. He has pointed out, and inculcated strongly in his works, the good effects which may be produced by this drug; and, in consequence of his labours, it is now used with much more freedom in fevers, and other diseases, than formerly. But, notwithstanding the great merit of his observations upon the usefulness of Narcotics in practice, and notwithstanding my regard for his judgment in general, I cannot agree to his theory respecting their manner of acting.

This theory is founded upon a multitude of data, which may reasonably be disputed, and some of which are, in my apprehension, totally inadmissible.

In the first place, our faith is required to an *invifible* nervous fluid, faid to be endowed with a number of very fingular properties.

Secondly, we are to believe that Narcotics, when applied to the nerves of the ftomach, have the power of rendering this invifible fluid lefs elastic and lefs moveable. And as a grain or two of opium, when fwallowed, diminifhes or renews pain in any part of the body, this theory requires that the opium fhould leffen mobility, not only in the fluid of thofe nerves with which it comes in contaét, but alfo in the nerves over the whole body.

If it were in the power of our fenfes to behold this fluid, and to perceive fuch an effect produced upon it by an opiate pill, we fhould have difficulty in crediting what we faw, and fufpect fome delufion in our fight. But when we can fee no fluid whatever, and are as little certain of its exiftence, as  
of

of these changes said to be performed on it, by the touch of opium, we must hesitate in lending our belief to such an extraordinary phænomenon.

And to what purpose should we admit this nervous fluid? it ultimately explains nothing; it only puts back the difficulty one step; for when it is said that the oscillations of the nervous fluid convey sensation to the brain, and irritability to the living fibres; if it is then asked, how do these oscillations cause their effects? the theorist is as much at a loss, as the Indian was to tell upon what the tortoise stood, which supported the elephant that bore the world on its back.

And if we were disposed to admit all the above-mentioned suppositions, they are still found insufficient to account for the inebriety which is produced by most of the substances comprehended under this class.

For

For although by this theory we might expect that opium and wine would produce drowfiness and infenfibility, yet it does not account for their producing the violent gaiety and delirium of intoxication.

To account for this, a new theory is found requifite; namely, that Narcotics are not only fedatives, but likewise *indirect Stimulants*.

And as the Narcotic is fupposed to be injurious to the human conftitution, the *vis confervatrix et medicatrix naturæ* opposes this evil influence, and by the contention between the benign and noxious powers, this mixture of fedative and ftimulant effects, inebriety is faid to be produced. It is by the fame fuppositions, that the ftimulant effects of Narcotics upon the circulation of the blood, is attempted to be accounted for. But I own that, after it is granted that ftimulants increafe, and fedatives decreafe the mobility of the nervous fluid,



fluid, which is Dr. Cullen's opinion, I should think it more natural to expect that those opposite actions would destroy each other, and of course that the nervous fluid would remain *in statu quo*. This ought to be the case if the sedative and stimulative power were exactly balanced; but if either predominated, it should produce its proper effect simply, though in a less degree.

The difficulty which this physician has found in forming a consistent theory, sufficiently proves how arduous a task it is to account, in a satisfactory manner, for the operation of Medicines. Perhaps it is looking for more than belongs to the genius of man, to expect that the precise manner of their operation should ever be clearly explained. Some light may, however, be thrown on this obscure subject, by attentively observing and comparing facts, and drawing conclusions and influences from

from what is either proved, or extremely probable from strong analogy with other circumstances of the animal œconomy.

In considering the effects of Narcotics upon the living body, the most remarkable is that of their assuaging or entirely removing pain.

In order to discover in what manner this effect is produced, it will be proper to reflect upon the nature of pain.

Pain is a sensation caused by a violent impression made upon the nerves ; although the pain is vulgarly supposed to be in the part injured, yet in fact it exists only in the brain; in the same manner as all our other sensations and ideas, although the first impression is made upon the extremity of the nerves. This may be proved by nearly the same arguments that Mr. Locke has made use of to demonstrate, that the qualities of whiteness and blackness do not exist

exist in matter, but that these sensations are only in ourselves.

It was foreign to Mr. Locke's purpose to consider in what part of our bodies sensations were felt, but it is easily demonstrable, that although it is upon the termination of the nerves that impressions are made, yet it is at their source, or in the brain, where they are felt. For any interruption being made by dividing or compressing a nerve, prevents all sensation. Or any considerable disease affecting the brain, makes it incapable of feeling impressions.

It is therefore evident, that the sensations occasioned by visible objects, by sounds, and by whatever affects the taste, as well as every thing producing agreeable or painful feelings, do not exist in the eye, ear, tongue, or any part of the body, but in the brain only.

Pain,

Pain, then, is an affection of the brain, produced by a violent impression made upon a nerve or set of nerves.

There seems to be only four ways by which pain can be relieved or removed.

The first is, by diminishing or removing the impression made upon the nerve which causes the pain.

The second is, by interrupting the communication between the part where the painful impression is made, and the brain.

The third is, in cases where, although the impression is made on the nerves, and conveyed to the brain, yet by a counter-affection of that organ, the action or commotion productive of pain does not take place.

The fourth is, where the brain is rendered torpid or insensible.

These four seem to include all the possible ways in which a relief from pain can be produced, and as these ways of alle-

viating pain are all abstractly possible, it is in fact found that all of them take place.

When a thorn or bullet has pierced into the substance of the body, the pain is often quickly relieved by the extraction of these irritating substances.

This is an instance of the first mode of removing pain.

The second mode is not so frequently practised, though it is certain, when it can be done, to be effective; namely, by cutting through, or destroying, the nerve which conveys the impression to the brain.

The third mode of relieving pain is accomplished by Narcotics; for it often happens that although a violent impression should be made on the nerves, and that impression conveyed to the brain, yet a strong dose of opium will alleviate, or totally remove, the painful sensation.

According to Dr. Cullen's theory, Narcotics act in the second mode; for he supposes that they diminish the subtilty and elasticity

elasticity of the nervous fluid, and consequently prevent the impression being conveyed to the brain. But the objections to this opinion, which have been already detailed, are, I imagine, conclusive.

It seems evident, that Narcotics act in the third mode, by exciting a strong affection in the brain; and not in the fourth, by rendering it torpid or insensible, although ultimately a very strong dose will have this effect, and even occasion death.

But that the first effect is an excitement in the brain, is proved by the exhilaration which is generally perceived upon swallowing a small portion of wine or laudanum, and by the increase of the action of the heart and blood vessels.

Almost all Narcotics occasion pain in the head when taken in too great a quantity, and most of them occasion pain and inflammation when applied to any tender part, as the globe of the eye, or the surface of a wound.

From



From all these facts, and many others of a similar kind, it is plain that Narcotics do not act by simply producing a torpid state of the brain; they, on the contrary, excite it; but the excitement being of a different nature from that which is occasioned by the usual painful impressions, counteracts their effects.

When an overdose of Narcotics produces a torpor in the brain, or death, this is owing to the violent action they have upon it, by which it is rendered incapable of its office; excess of pain, in the same manner, has been known to kill, as also excess of joy.

I imagine that an irritated nerve produces one action upon the brain, opium another of a contrary kind. And probably these two opposite impressions, in a great degree, destroy each other.

This opinion receives confirmation from the following observations. In a very vi-

olent degree of pain, a large dose of opium may be given without any bad effect, the action of the opium being spent in counteracting the effect of the irritation. Whereas the same, or a less dose of opium given at another time, when there is no pain to be overcome, and when of course the whole force of the dose operates on the brain purely, will occasion delirium, or even death.

On the other hand, it has been often observed, that if a person receives a violent hurt, or is alarmed with some sudden danger, while he is intoxicated with wine or opium, he becomes almost instantly sober, and regains his senses.

But although Narcotics and Irritations mutually counteract each other, to a certain degree, yet they do not so completely destroy each other's effects, as not to leave some discomposure in the brain.

If their action was perfectly simple and exactly opposite, an entire quiet state of the brain would undoubtedly take place on the exhibition of opium to a person in pain.

But the effects of opium and irritation being somewhat complex, it necessarily happens, that although they counteract each other in a considerable degree, yet the brain is still affected and disturbed by both ; in the same manner as the meeting of opposite winds do not entirely still the waves of the ocean.

The action of opium directly on the brain accounts for a circumstance not otherwise to be understood ; namely, that the local application of opium has little or no effect in relieving pain ; and what is more, it not only does not relieve pain, but a strong solution of it always makes a sore smart very severely.

That the external application of opium should not relieve pain so much as the inter-

nal exhibition will surprife no one, who recollects that the pain is in the brain, and not in the part. The opium will therefore relieve the pain moft effectually, when it is exhibited in fuch a manner as will make the moft fudden and powerful impreffion upon the brain : and that is, by throwing the opium into the ftomach.

The ftomach, we know, from anatomy, is lined with a villous coat, which is extremely vafcular ; the minute branches of the nerves cannot be made apparent like the blood veffels ; yet there is every reason to believe, that the villi are full of nervous filaments, as well as of blood veffels, which nervous filaments are expofed fo as to be very fufceptible of impreffions. In confequence of this the ftomach has as great a fhare of fenfibility as almoft any organ of the body, and the impreffion of the opium when applied to it is quickly conveyed to the brain, and there produces its effect.

When

When opium is applied to the external skin, the nerves being covered with cuticle are not equally sensible to its impression; and when opium is applied to a painful sore, the nerves being already irritated by the inflammation, are ill adapted to convey the impression of opium to the brain; therefore, as was before observed, little or no relief is procured, and a very strong solution of this drug always occasions an increase of pain, but when the solution is weak, it seems rather to give ease. Indeed, this last application seems to have a tendency to diminish the action of the vessels, which is the cause of the pain. And it is applications which have this tendency, that of all others have the greatest effect in diminishing pain.

The next effect of Narcotics, to be taken notice of, is their occasioning intoxication. When it is remembered, that Narcotics act powerfully upon the brain, it is natural to

expect, even *à priori*, that if taken in too large a quantity, they will occasion at least a temporary deprivation of reason. For the perfection of reason depends upon a calm and undisturbed state of the brain. This organ is the centre where all the nerves terminate, and is the seat of reason.

And however inexplicable, the fact is certain, that whenever the brain is agitated or compressed, there is always a proportionable injury to its functions, particularly to the exercise of the intellectual faculties. Wine and opium acting upon the brain, and disturbing its quiescent state, of course diminish the reasoning faculty, and lessen the power of the will over the voluntary muscles. This accounts for the inability to walk, and the staggering of a person who is drunk.

To reconcile to one general principle all the effects of Narcotics is by no means an easy task, and has never yet been effected ;  
for



for many of their actions seem diametrically opposite to each other. For example, a few glasses of wine, or a moderate dose of opium, prove a powerful cordial. They augment the strength both of body and mind. They enable the body to go through greater fatigue; and when the spirits are sunk and desponding, they at once give cheerfulness, fresh courage, and animation. But a larger quantity of the same Narcotics being swallowed, produces the most melancholy and degrading effects. The person is not only deprived of all strength of body, but even of his reason.

There are other contradictory circumstances in the powers of Narcotics. They are given successfully to diminish spasms and violent actions, and they are likewise given successfully in cases of relaxation and debility, to increase the power of muscular contractions. I think all these contradictions may be reconciled,

and every effect whatever of Narcotics explained by the principle formerly mentioned, that these substances act upon the brain, and are in fact stimulants.

The name stimulant, when given to Narcotics, will surprise many, as they have been usually stiled sedatives; but let it not be rejected without consideration.

Opium, wine, and ardent spirits of every kind, are always cordial in a moderate dose. This, I think, can only proceed from an excitement or stimulus which they give the brain. They augment the force of the heart and vessels, and occasion a more powerful circulation of the blood.

Although Narcotics increase the force of the pulse, it is often found that they decrease its frequency. This is a natural consequence: for the frequency of the pulse is often occasioned by weakness; the heart endeavouring to remedy the feebleness of its contractions by acting with more frequency.

It

It is from this well-known power, that Narcotics are found such effectual remedies in mortifications, putrid fevers, and other diseases where there is a great debility; and for the same reason they are injurious to persons affected with inflammatory diseases, and in those complaints where there is too violent an action of the vessels.

The stimulus given to the brain by Narcotics seems to be of a very opposite kind from that given by an irritated nerve. They therefore have the effect of counteracting the impression of the other. And as there is a considerable similitude between the removal of pain, and the acquisition of joy, it need not be wondered at that Narcotics usually excite cheerfulness and mirth.

Such are the effects of a moderate dose of Narcotics; but if the quantity is very large, the great commotion given to the brain produces delirium, and the sickness and nausea seem to be an effort of the *vis medicatrix*

*medicatrix* of nature to disburthen the body of a load which oppresses it.

Narcotics are powerful antispasmodics. The removal of spasms is probably effected in the same manner as the diminishing of pain. The cause of spasms is some excitement in the brain, and the excitement produced by the Narcotics being of a different kind, counteracts it.

There is no property of Narcotics, perhaps, which makes them more useful than that of procuring sleep; and this property, I think, is explicable upon the same principles with those we have laid down concerning their mode of action.

After the exercise and labours of the day, every man who is in good health, and whose mind is not agitated by cares, terrors, or diseases, naturally sinks into profound sleep. In this state, every limb, and every part of the body, inclines to the easiest posture; all the voluntary muscles become relaxed, and  
an

an insensibility or stupor spreads itself over the senses. There is not, however, in sleep, an annihilation of ideas ; these continue to pass through the brain in succession. When these ideas have been of a striking and remarkable kind, and when they are remembered in the morning, they are named dreams ; but when the ideas have been uninteresting and are forgotten, it is sometimes erroneously imagined, that no ideas took place during sleep at all.

In sleep, the mind becomes so torpid, that slight impressions are not felt ; or else the nerves become so inactive, that they do not convey slight impulses. But a very violent impulse awakens quickly, and affects the brain as usual.

During profound sleep likewise, there is a total suspension of the power of the will ; we can neither direct our thoughts nor our muscles according to our inclinations, as we do when awake. The whole power of the  
mind



mind over the body is therefore suspended. But all those actions which are independent of the will, such as the circulation of the blood, respiration, digestion, &c. go on during sleep as well as when we are awake.

A suspension of any of these actions would quickly be followed by death, or the greatest inconveniency. Our bodies therefore are happily framed, so that the organs employed in these actions are never fatigued, and require no respite. But the voluntary muscles, and the powers of sensation and volition, after a certain exertion, become, in consequence of some necessary weakness, exhausted and wore out, and an entire cessation of action becomes requisite to restore them to their wonted vigour. This explains why bodily rest alone, without sleep, is not sufficient, and does not refresh. For as long as sensations are felt, our will is continually exerted, and our posture is frequently changed. Instead of a complete  
repose,



repose, this is only a state of less violent action.

Nothing but sleep procures complete refreshment, which on that account is often named a blessing. It is so, to be sure, but that arises doubtless from some necessary weakness in the constitution of our frame. Our bodies and minds would certainly be more perfect, if they never required such repose. Should it still be thought a blessing, because it throws us into a state of oblivion for a time, making us insensible of all the miseries of life, it must also be considered it interrupts our enjoyments; and if the latter are not superior to the former, although we must then confess that sleep is a blessing, we must at the same time admit that death would be a greater.

I have said, that in sleep, ideas are continually passing through the brain. This power of the mind requires no repose, and being a source (as I imagine) of more pleasure

sure than pain, we are fortunately never deprived of it. A man would otherwise pass one third of his lifetime in a state similar to vegetation.

The ideas that occur in sleep are furnished from that stock which were received from our senses when awake, and were stored up in the memory. No new idea ever occurs when asleep; but only the old, which, however, are often strangely combined and arranged.

We are totally ignorant of the manner in which ideas are excited in the mind. The nature of ideas is equally unknown. They are all originally acquired by means of the senses; but their continual succession, and the mode of their excitement, are incomprehensible.

By the power of the will we can bring before us any idea we please; and love, hatred, terror, ambition, avarice, and a thousand other moral causes, excite ideas frequently even in spite of our will. Many  
of

of these causes continue to operate in our nocturnal ideas or dreams.

If a man attends to what is passing through his head, even when awake, he will perceive a train of ideas very similar to a dream.

Ideal representations are however far less lively than real impressions. The colours, red, blue, or white, as fancied by the imagination, are fainter than when reflected from real objects.

In our minds appearances are seen faintly; sounds are heard imperfectly; the sensations of smelling, tasting, and even feeling, whether of a painful or agreeable kind, are indistinct.

When a man is actually awake, he finds no difficulty in distinguishing these visions in the imagination from real impressions; because his senses correct the error, and make him sensible of a striking difference. But to a person who is asleep, those visions

often appear realities: for his senses being in a torpid state, he has no means of correcting his imagination.

It has been mentioned, that a man in profound sleep loses the power of the voluntary muscles; he therefore, for the most part, continues immoveable however much his mind is agitated: yet to himself he appears to have the power of moving and acting. He can believe himself climbing up a steep hill, engaging with an enemy, or performing any action which it is possible to imagine. He sometimes seems flying to avoid a danger he fears, and at others hastening to enjoy a pleasure he covets. But when he awakes, his senses again resume their usual energy, and instruct him in his error: he is then either gratified or mortified, to find that all that has passed is only a dream.

There is a singular irregularity which sometimes takes place in sleeping, which is,  
that

that the person does not lose the power of the voluntary muscles, but is able to walk and move as if awake.

The difference between a man who walks in his sleep and a person really awake is, that the former is insensible to all or the greater number of external impressions, and his actions are principally determined by the ideas which are passing through his brain, and are not consonant to real circumstances, and the actual situation of things. They appear consequently absurd. Whereas a man who is awake, sees the material world; he is sensible of sounds, scents, tastes, and of feelings; his actions are therefore conformable to the situation and circumstance he is in, and are directed by his judgment.

An absent man is one who occupies himself so much with the ideas which are floating in his head, that he neglects and be-

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comes

comes insensible to external objects; and when he is plunged in a reverie, he differs little from a somnambule.

A madman, from some derangement in the brain, imagines that those ideas which occur to him are realities. His ideas are generally of an extravagant nature, and he is much more affected with them than with real objects. His words, actions, and behaviour are therefore absurd and irrational.

After this digression upon the nature of sleep and ideas, I now return to endeavour to show, how Narcotics, particularly opium, act in order to procure sleep.

It is the nature of man to drop asleep at night, as his mind and body are then exhausted by exertions during the day. But there are many causes which occasionally prevent his falling into this state of tranquillity. Pain, fever, and a great variety of diseases,



diseases, likewise cares, and all violent passions of the mind, by rousing and agitating the nervous system, often prevent the brain from sinking into that torpid state which is essential to sleep.

It seems to me, that Narcotics occasion sleep, rather from counteracting the effects of the irritating causes which are above enumerated, than from a specific power of numbing the senses, and forcing them to sleep.

If the latter were true, Narcotics would on all occasions tend to produce sleep. But this is so far from being the case, that when a man is in danger, contrary to his inclination, of falling asleep from great fatigue, one of the best modes of enabling him to shake off his drowsiness, is, to swallow a glass of wine, brandy, or some other Narcotic.

Soldiers or seamen habitually chew or smoke tobacco, which is a powerful Nar-

cotic; and they find that, by this means, they are the more able to resist the inclination to sleep when on duty.

These facts are additional proofs, that Narcotics act always as stimulants; and they demonstrate, that these substances have no specific power of causing sleep, but the reverse. For being cordials, they excite the nervous system, and give a renewal of strength.

Although the immediate and precise action of Narcotics is so very different from procuring sleep, yet they have often that effect, and in a very remarkable degree.

This, I have already said, appears to be owing to their alleviating those irritations which prevent sleep.

If a man is kept awake by pain, or any bodily uneasiness, Narcotics often remove or lull the distressing sensation, and sleep then generally takes place.

Wakefulness is likewise produced by mental affections. Poignant grief, or some violent passion, often so powerfully engrosses and agitates the mind, that the ideas which are excited cannot be shaken off or forgotten. This cause will prevent sleep as effectually as bodily pain.

But, even in these cases, Narcotics sometimes operate so powerfully upon the brain, as to counteract, or suspend, in some degree the impression made by the mental agitation. The person then procures some sleep, which is not unfrequently disturbed by dreams that have a reference to the ideas which prevailed when awake.

It seems not improbable likewise, that the sleep which Narcotics produce, is prolonged in consequence of the cordial powers which they exert as soon as swallowed. For it will necessarily happen, that when the action of the Narcotic ceases, the excitement that

this medicine gave, must occasion a proportionably longer repose. This is perfectly natural, for as the muscles and nerves require rest, from their powers being exhausted with exertions, greater exertions must produce longer sleep. This will always be the case, except the Narcotic has been swallowed in so large a dose, or such violent exercise has been taken, as to occasion disease, the irritations of which may prevent sleep.

Narcotics, when exhibited in a moderate dose to those who cannot sleep from some distress either of body or mind, often act in a very striking manner. The stimulus of the Narcotic counteracts, and proves an antidote to the irritations with which the wretched sufferer is tormented; and, instead of being kept awake with misery, tossing in his bed, and counting the tedious hours, by degrees he loses the sensation of  
pain,

pain, his anxiety and restlessness are lulled and quieted, and if he continues awake, he is composed, and free from unhappiness, but he generally at length enjoys the comfort and solace of sleep.

## S I A L A G O G A.

**I**T is generally admitted, that Quicksilver is one of the most useful Medicines of the whole Materia Medica. Our curiosity is therefore peculiarly excited with regard to it.

There are a set of Medical Practitioners who are totally indifferent respecting the theory of the action of Medicines, provided they know in general the effects ; but there are others who take pleasure in investigating the operations of nature, and of searching with the greatest assiduity into the qualities and essences of things ; a disposition, which, in my opinion, leads to safe and successful practice. It is only persons of this turn of mind whom I have any hope of interesting in the following discussion.

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The most remarkable medicinal property of Mercury, is that of counteracting the Syphilitic poison: but before that action is considered, it is proper to enter fully into the nature of that virus.

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## OF SYPHILIS.

**T**HE *Materies Morbi* of Syphilis, as well as of Small-pox, and other diseases, is invisible, and known only by the effects. It is of a fixed and not of a volatile nature; therefore, although the disease is contagious, the contagion can only be communicated by contact.

This virus is principally resident in pus.

Syphilitic pus so exactly resembles common pus, that no difference can be discovered between them, either by optical or chemical researches. Yet the pernicious effects produced in the human constitution by the former, proves that there is an important

portant difference. The Syphilitic matter, like the other, is a secretion from the blood.

It is no new element sprung up, for all the particles of which it is formed exist in the blood of every man. But these particles which are the essence of Syphilitic matter are kept asunder, and united with others, which render them innocent when men are in perfect health. Innumerable late discoveries in chemistry have shewn us, that matter acquires very different properties by different combinations. A small addition of one species of matter will change another, from an acid to a mild nature, and *vice versa*.

The chemist can do this artificially, and the human body, when affected by this disease, naturally forms from the mildest blood, by some similar operation, a substance of the most noxious and malignant kind.

In considering how this is formed, we are led back to the general doctrine of secretion.

There

There are but two ways in which fluids can be separated from the blood; the one is, by a mechanical straining or filtering; and the other is, by a change of properties produced by some chemical means. It seems impossible to conceive any third mode.

Baron Haller has attempted to explain the whole mystery of secretion upon mechanical principles, but without success; for it is only substances which are mechanically diffused through the blood, which can be separated by mechanical means, and not those which are chemically combined.

No mechanical filtration of a solution of a neutral salt can ever separate the acid from the alkali, with which it is in union. This can only be accomplished by a chemical process, such as adding some substance to which either the acid or alkali has a greater affinity than they have to each other.

The

The constituent parts of many of the secreted fluids, and pus among the rest, are chemically combined with other particles of the blood. Their separation must therefore be accomplished by a chemical operation.

A mechanical apparatus is necessary to convey the blood in a proper condition to be acted upon, but the ultimate change is a chemical one.

Although it seems clear to me, from the nature of the circumstances, that this is the case; yet there is great difficulty, or perhaps it is impossible to discover by what particular chemical operation the change is effected; and the structure of the secreting vessels is too minute ever to be inspected.

Let it then be taken for granted, that all pus is formed by some chemical operation; and let us next examine the formation of  
that

that particular pus which has been denominated Syphilitic.

How this poison originally sprung up, is totally uncertain ; but it is now produced only by infection.

It is a fact equally extraordinary and melancholy, that when Syphilitic pus is applied to any part of the human body, matter is formed of the same noxious and contagious nature with that applied.

Many theories have been invented to explain this, and the other phenomena of Syphilis ; I shall only take notice of the two most distinguished.

The first is, that the poisonous quality arises from a species of fermentation in the fluids, produced by the contact of Syphilitic matter.

The second theory is, the invention of the most philosophic surgeon which this age has produced ; and although my original intention was, only to consider Dr.

Cullen's

Cullen's opinions; yet, as this second theory is so very ingenious, and as it is necessary that we should form a just notion of the Venereal Disease, before we can understand the manner in which mercury removes it, I shall take the liberty to consider this latter theory also.

Mr. Hunter, in his celebrated treatise on the Venereal Disease, sums up his doctrine in the two following passages:

He is of opinion, "That the animal body  
 " has a power of producing matter according  
 " to the irritation given, whereby the living  
 " powers whenever irritated in a particular  
 " manner, produce such an action in the  
 " parts, as to generate a matter similar in  
 " quality to that which excited the action\*."

The second passage is, "I shall therefore  
 " consider it (Syphilitic matter) as a poison,  
 " which, by irritating the living parts in a  
 " manner peculiar to itself, produces an in-

\* Hunter's Treatise on the Ven. Disease, p. 17 and 19.

" inflammation



“ inflammation peculiar to that irritation  
“ from which a matter is produced peculiar  
“ to the inflammation.”

Mr. Hunter therefore considers venereal matter as an irritating substance, which, when applied to a part, instead of exciting the secretion of common pus, like other acrid substances, has the extraordinary property of making the vessels secrete venereal pus. Considerable difficulties however oppose this hypothesis.

First, it does not readily accord with an observation which Mr. Hunter himself has made in another place, respecting the use of suppuration. No one before him, I believe, ever attempted to explain the use of suppuration, and he has given an explanation of its use, which is satisfactory and convincing in many cases.

“ The intention of suppuration, he says,  
“ seems to be, to wash away the irritating  
“ matter ; so that irritations are endeavour-  
“ ing

“ing to produce their own destruction, like  
“a mote in the eye, which, by increasing the  
“secretion of tears, is itself washed away \*.”

If this opinion is just, and it seems so probable that it can hardly be doubted, it is a strong objection to the theory that vessels secrete venereal pus. Because it must then be supposed, that venereal pus is formed in order to wash away venereal pus, which seems difficult to believe.

Besides this objection, there is another :

We cannot comprehend how venereal, variolous pus, and all the other morbid poisons, for probably all are formed by similar means, should always cause the formation of virus of their own species. There is here no apparent connexion between the cause and the effect. For we see no reason why venereal pus should not occasion the secretion of variolous matter, as well as that of its own kind.

\* Hunter's Ven. Disease, p. 34.

If,

If, however, to avoid these difficulties, we should take up the opinion, that venereal pus is formed by a species of fermentation, it will be found that the objections to that notion are still greater, and even insurmountable.

Mr. Hunter has stated several. In particular, he made the experiment of applying venereal pus to a common sore, without its changing that sore into a venereal one. It is evident that this must always have happened if the pus could act as a ferment. But it only happened once, although he made the experiment several times.

And besides this, it is a certain fact, that in gonorrhœas, chancres, and buboes, it frequently happens, that before a cure is accomplished, the discharge is changed from venereal to common pus. But if the contagious pus acted as a ferment, the discharge would certainly be venereal as long as it continued.

These reasons, I think, make it certain, that venereal pus does not act as a ferment. Mr. Hunter's opinion must therefore be well-founded: for as the discharge from gonorrhœas and chancres is venereal pus, that pus must either be formed at once by the action of the vessels, or common pus must be formed, which is immediately changed into venereal by some fermentative process. And the latter opinion being disproved, the former must be just, although there are some difficulties attending it.

When venereal matter is absorbed, and mixed with the blood, it taints the constitution, and produces the confirmed lues.

Mr. Hunter explains the symptoms which occur, by supposing that the contagious pus, in circulating through the body, *irritates* certain parts, and *disposes* them to disease.

He is of opinion, that the virus remains only a short time in the body, and is soon expelled by the secretions; but that those  
parts

parts which were contaminated after a certain time begin to act and inflame, and all the evils of this odious disease then go on progressively.

The blood, according to this theory, is supposed to be untainted, and every venereal symptom is a local effect produced by some particles of the matter which were absorbed, irritating the solids in circulating through them.

Irritation is then the sole cause of the constitutional symptoms of the lues venerea, as well as of the primary effects.

But I cannot help being of opinion, that there must be something more than mere irritation in the case. For, according to this theory, the virus is not augmented within the body. All the symptoms must therefore be produced by the matter absorbed. Yet the quantity of this is often so very small, and the symptoms so dreadful and universal, that it seems impossible

that such dismal effects should proceed from so inconsiderable a cause.

It sometimes happens, for example, that a small chancre is healed, after being open only a few days. The quantity of matter absorbed in such a case must be very small; yet the most unequivocal symptoms of universal disease often are the consequences of this absorption; namely, fever, ulcers in the throat, blotches over the whole surface of the body, violent pains in every limb, and swellings and ulcerations in the bones.

All, or the greater number of the above-mentioned symptoms would undoubtedly occur if no mercury was given; and those symptoms would increase till the patient expired in the most shocking manner. I own it seems to me in the highest degree improbable that all this mischief should proceed from the irritation of the few particles of venereal pus absorbed, unless the virus was augmented in quantity by some means or other.

This



This argument will appear in a stronger light when applied to the poison of the small-pox. The analogy between the two diseases is in many respects striking, and as Mr. Hunter applies his theory to both these poisons, it is fair to raise objections from each of them.

In the present mode of inoculating for the small-pox, a puncture of the smallest size possible is made with the point of a lancet dipt in variolous pus. This raises a small pimple containing a grain or less of matter. How much of this is absorbed is uncertain, perhaps sometimes not the fourth or eighth of a grain. But the consequence of this absorption is, that the whole system is sometimes affected with an alarming fever, and contagion flows from every pore of the body, sufficient to infect ten thousand persons.

Can these symptoms proceed from the few particles absorbed alone, without the

poison being afterwards increased in the blood? For my own part I cannot conceive this; but am strongly convinced that the quantity of virus, both in the venereal disease and small-pox, must be exceedingly augmented in the blood after absorption, and I know of no other way by which the symptoms can be accounted for.

When this is admitted, it is then to be inquired, how the quantity of virus can be increased in the blood.

I have already endeavoured to prove, that venereal pus could only be formed by a chemical process; and I cannot help thinking, that this augmentation of the virus must necessarily be accomplished by similar means.

The precise mode has not hitherto been discovered; and if it were discovered, it could not probably be demonstrated. As the virus is of a nature *sui generis*, the operation by which it is formed may be

be unlike any other. It appears, however, to be more similar to fermentation, than to any other operation in nature; and the action of the infecting matter in the blood, in many respects, resembles that of a ferment.

I must, however, take notice of one striking difference; namely, that those substances called ferments only hasten a process which naturally would have taken place of itself.

For example, leaven quickens the fermentation of paste; but paste naturally ferments of itself, although it requires a longer time than when mixed with leaven.

Now common pus or blood has naturally no tendency to form venereal virus. The action of venereal matter upon the blood, in that respect, therefore differs from that of a common ferment on those substances on which they operate. Yet as we have no better word than fermentation to

express the change in question, we think proper to adhere to it, though some pathologists have preferred the word *assimilation*.

While it seems to us probable that venereal virus occasions something like fermentation in the fluids, it is likewise evident that it irritates the solids.

A complete explanation of the phenomena of the venereal disease, therefore, can only be obtained, by admitting, in some degree, both the theories of irritation and fermentation.

In the gonorrhœa, I am of opinion, that by the contact of infectious matter, the internal surface of the urethra is irritated. Inflammation and suppuration ensue, and, by some peculiar action of the secreting vessels, venereal matter is formed.

The gradual abatement of the inflammation, and the final disappearance of the symptoms, when no remedies are applied, is owing to the cause ascribed by the celebrated

brated surgeon whose work we have before so much noticed, namely, to the parts affected becoming less and less susceptible of the irritation \*; a circumstance common to almost every irritation that affects the human body.

The same causes account for the appearance and progress of chancres.

The irritation of the virus excites inflammation, suppuration, and ulceration, and the matter formed is venereal. These symptoms do not abate or wear out of themselves, as in the gonorrhœa, by the parts becoming accustomed to, or less susceptible of the irritation, because the same parts do not continue to be irritated; for the ulceration forming a perpetual succession of surfaces, the sore therefore spreads without end.

In the progress of absorption the same effects often occur in the lymphatic glands.

\* Vide Hunter's Ven. Disease, p. 34.

But

But when the venereal matter gets into the blood, and is diffused over the body by the circulation, a new and different set of symptoms take place. It is some time, however, before they appear. The virus is perhaps so much diluted by being mingled with the chyle, and the whole mass of blood, that it is incapable of irritating the constitution.

At last, however, the poison begins to work. Sometimes only one or two parts of the body become diseased, at others the mischief is extremely general. It is chiefly from this last circumstance that I am persuaded, contrary to Mr. Hunter's opinion, that the virus is augmented in the blood by a kind of fermentation. If it is admitted that the venereal pus can act upon the blood in any respect like a ferment, there is no longer any wonder that the symptoms are general. It is, on the contrary, rather extraordinary,



ordinary, that any part of the body should escape.

But with this contagion, as well as with all others, some parts of the body are easily affected; some with more difficulty, and others are not at all susceptible of irritation.

In the small-pox, for example, where the virus is always contagious, and sometimes malignant, the surface of the body, and the passages into it, only are capable of being affected.

In Syphilis, the vulnerable parts are unfortunately more numerous; the throat, the skin, periosteum, and bones, are the parts chiefly acted upon.

But the disease which occurs in consequence of the constitution in general being contaminated, is somewhat of a different nature from that which takes place immediately on the local contact of the virus.

The inflammation in the secondary symptoms is not so violent, the ulceration does  
not

not spread so rapidly, and the pus formed is not infectious.

The difference is owing to the primary symptoms being produced by venereal pus, and the secondary by venereal blood. The ferment in the blood seems to form a virus of a milder kind, or at least of such a kind as is incapable of occasioning the secretion of infectious pus.

The opinion of something like fermentation taking place in the blood, is corroborated by the extraordinary symptoms which have taken place in some persons from having had a tooth transplanted.

Mr. Hunter has narrated six cases of this, and he is of opinion that the disease thus produced was not the venereal disease.

He has shewn that, in some instances, the complaints were cured without mercury at all; and where mercury was used, that in one case a cure was produced by a quantity too small for extirpating the venereal virus,  
if

if it had existed. And that in other instances, the disease recurred repeatedly, notwithstanding courses of mercury were used sufficient to eradicate a venereal infection.

The arguments and chain of reasoning introduced by Mr. Hunter on this subject are admirable ; and they demonstrate that the disease which has been sometimes produced by transplanting teeth, is not exactly similar to the common venereal disease.

A disease of some kind or other however certainly is produced. And it is well worth investigating, of what nature this disease is, and what is its proximate cause.

Mr. Hunter conjectures, that the irritation arising from the insertion of a fresh tooth, even although perfectly free from all disease, is sufficient to account for all the symptoms that have ever taken place.

Notwithstanding the great and sincere deference I have for this gentleman's opinion,

nion, I confess that it strikes my mind as very improbable, that a disease should be created in a constitution, by inserting into the mouth a tooth free from all disease. It appears to me more probable, that in all the instances where extraordinary symptoms occurred, the transplanted teeth were imbued with some distemper, although they, as well as the persons from whom they were taken, seemed sound and healthy.

Irritation alone might produce inflammation, and perhaps caries in the socket, from the transplanted tooth acting like a hard extraneous substance; but I cannot conceive how the simple irritation of the socket of a tooth should occasion blotches on the skin, ulceration in the throat, nodes in the bones, and pains in the limbs. All these symptoms have occurred from transplanting teeth, but have never been observed to occur from drawing a tooth, or from performing any other operation on the  
2 jaw-

jaw-bone, however painful or irritating. And since irritations of a far more violent kind do not produce such extraordinary symptoms, I think it cannot be admitted that slighter irritations do.

The transplanted teeth, in my opinion, acted very differently from a common extraneous body. They seem to have been peculiarly noxious, or, in other words, to have been tainted with some disease.

The disease which it is most natural to suspect, is that to which the symptoms have the greatest resemblance.

In one instance, Mr. Hunter suspected that the symptoms which followed the transplantation were scrophulous; but he thought at the same time, that this was owing to the scrophulous constitution of the person who received the tooth, and not to any disease in the person from whom it was taken. Yet this is difficult to prove, and it seems no way impossible for scrophula



phula to be communicated. But in most of the cases, the symptoms had a far greater resemblance to those of the venereal disease, than to those of scrophula.

For the gums inflamed and ulcerated with great violence, the socket into which the transplanted tooth was inserted frequently became carious; in some instances ulcers took place in the throat, blotches on the skin, and swellings on the bones near the superficies. All these symptoms, and every appearance of complaint, were generally dissipated by the exhibition of mercury.

Notwithstanding these facts, there are some circumstances which mark, that the disease produced by transplanting teeth differs from the common venereal disease.

After the insertion of the teeth, the symptoms were later in breaking out than usually happens after venereal infection. In one instance, sea-bathing produced a cure; in another the symptoms gave way of themselves.



themselves. In two others, although the symptoms yielded to mercury, they again recurred after such courses were given, as were sufficient to eradicate the venereal disease. And in one case, a course of mercury too slight to remove a venereal infection, proved sufficient to cure the disease.

From these facts, and from the reasoning of Mr. Hunter, it seems clear, that the disease in question differed considerably from the common venereal disease. But this does not prove that the disease was not excited by a tooth infected with that virus.

The common venereal disease is produced by the application of venereal pus to the body.

But it is very possible that the application of venereal blood should likewise produce a disease. And it is not to be expected, that the disease produced in the one way, should exactly resemble that produced in the other.

On the contrary, a different set of symptoms ought to be expected; for it is evident that the virus in some degree changes its nature in its passage through the human body.

The matter of gonorrhœas and chancres is generally the first formed, and is probably the most virulent kind. That of the bubo is perhaps a little changed by being mingled with the lymph; for venereal buboes sometimes heal without mercury.

When the contagious pus is mingled with the blood, the virus is augmented, as I imagine, by some species of fermentation.

But this new virus is certainly not like the old. For the blotches and ulcerations which take place in consequence of a contaminated constitution, by no means resemble chancres, either in their appearance or progress.

The pus of secondary ulcerations is so different from that of a chancre, that it is  
incapable

incapable of producing infection. This Mr. Hunter discovered by actual experiments, for he found that this pus, when put into a recent wound, occasioned no disease, and did not prevent its healing in the usual time.

It is perfectly consonant with the view which I have endeavoured to give of the venereal disease, that the transplanting a tainted tooth should produce symptoms different from those of Syphilis.

When a constitution is tainted with Syphilis, the secondary ulcers never heal without mercury. These ulcers proceed from virus in the blood; and whatever efforts the constitution makes to heal them are fruitless, because the blood which circulates through the ulcerated surfaces is tainted. The sores therefore must continue to spread till the virus is corrected.

But the ulceration in the gums and alveolar process, from inserting a contami-

nated tooth, is not prevented from healing by the same cause. For the blood is pure which circulates through the inflamed gums and socket of the tooth; and therefore, when the tooth, the cause of the mischief, is extracted, it is not surprising that the ulceration should stop, and that the sore should heal without mercury.

Although the removal of the tooth in the cases alluded to always favoured the cure of the disease in the socket, yet it did not eradicate the complaint. The constitution, after a certain period, was affected by absorbing the contagious blood contained in the tainted tooth. True Syphilis, however, was not by this means produced. The virus was changed in its passage, either by the action of the vessels, or by being mixed with the lymph and chyle. The Syphilitic virus was therefore not generated in the blood, but a disease was produced of an exceedingly disagreeable

able nature, which had a strong resemblance to Syphilis, but differing from it in many particulars, and especially in this, that the constitution alone appeared sometimes able to overcome it.

The opinion which I have endeavoured to impress, that the venereal virus changes its nature during its progress through the living body, is farther corroborated by the extraordinary symptoms which have sometimes appeared in nurses and infants.

Infants suckled by infected nurses, are so often seized with complaints resembling the venereal disease, that it leaves very little doubt of their having been contaminated. The disease, whether conveyed by the milk, or by contact with the nurse, is of so mild a nature, that the constitution alone, unassisted by mercury, has been able to dissipate it.

Tainted children have likewise communicated an infection to nurses.

Mr. Hunter, with his usual attention to nature, observed, that the diseases excited in nurses from children supposed to be contaminated with Syphilis, and in children from infected nurses, differed from the common venereal disease; he therefore concluded that such nurses and children had not the venereal disease. And his conclusion is just: the disease they were infected with, is certainly not the usual venereal disease; but it is a disease derived perhaps originally from that stock, and changed by the various mixtures and transfusions it has undergone.

There is actually an hospital at Paris solely for infants who are born with the venereal contagion, which generally proves too powerful for their delicate frames. For although the greatest attention appears to



be paid to them, it is acknowledged that by far the greater number die \*.

I shall now conclude my remarks upon the theory of the *Lues Venerea*, by observing, that some centuries ago, almost every disease was supposed to be owing to some humour or affection of the blood.

This having been found in many instances ill founded, has tempted some persons to reject humoral pathology altogether; an extreme perhaps as erroneous as the other. Our bodies are composed of solids and fluids, and there is great reason to suppose, that both are susceptible of disease.

Upon the whole, therefore, it appears to me, that neither the theories of irritation, or fermentation alone, will explain all the phænomena of the venereal disease. This

\* Vide Histoire de la S. R. de Medicine à Paris. Année 1779, p. 181.

can only be done by admitting, that the venereal virus acts both upon the solids and fluids. Upon the solids it causes inflammation and suppuration; on the fluids it occasions something like fermentation, by which the poison is augmented *ad infinitum*.

## OF MERCURY,

AFTER having attempted to give the theory of the Venereal Disease, I shall next proceed to consider its antidote. The discovery of this is perhaps the most fortunate that ever was made by mankind; for the effects of the venereal virus upon the human constitution are the most shocking that can well be imagined. The famed *Vis Medicatrix Naturæ* is totally unable even to put a check to its ravages.

If some medicine therefore had not been discovered, capable of counteracting its violence, every person whose habit was once contaminated, must inevitably have expired by a lingering torture.

Our ancestors, whose industry was sharpened by the dreadful effects of the disease, at length happily discovered that Mercury had the power of curing it,

This

This mineral had been long in use as a medicine. It had been found serviceable in many eruptive diseases, particularly herpes, and leprosy, and therefore naturally was tried in venereal eruptions, almost as soon as the disease appeared in Europe.

But as the proper management of Mercury was not at first understood, it was either used in too small a dose, which rendered it ineffectual, or in too great a one, which often proved fatal.

The danger of large doses was so great, that no regular physician, who had either humanity or regard for his reputation, would recommend it. It was therefore only exhibited by quacks, and men of desperate characters; and dreadful work they made with it. For thinking the greater the dose, the better chance there was of curing, they used it in such quantities, that few survived the treatment. Some however recovered; and as no other remedy was known, regular physicians

physicians and surgeons gradually adopted it, and improved the manner of exhibiting it to such a degree, that at present it is generally both a safe and almost certain cure for every symptom of the venereal virus.

But notwithstanding that the fact of its curing the syphilitic poison is now universally admitted, the mode in which it accomplishes it is by no means agreed on.

Dr. Cullen maintains, that Mercury acts simply by exciting a great evacuation, and that the virus is thrown out by some of the excretories.

This likewise was the earliest opinion, and a very natural one ; because it was the ancient practice to exhibit Mercury in such large doses, as always excited some great evacuation.

In a complaint in which Dr. Cullen was probably little conversant, he remained satisfied with the opinion generally received.

But

But as it is now ascertained in the most authentic manner, that Syphilis can be cured without the sensible increase of any evacuation whatever, some other explanation of the salutary effect of Mercury seemed requisite, especially as the greatest evacuations, when excited by other means, are found to have no effect in diminishing the violence of the disorder.

Mr. Hunter, after pointing out the insufficiency of the above-mentioned explanation, gives his own opinion, which I believe is perfectly original, and quite conformable to his theory of the action of the venereal poison.

“ Mercury \*, in his opinion, operates  
“ upon the principle of destroying the  
“ diseased action of the living parts, counter-  
“ acting the venereal poison, by producing  
“ another of a different kind.”

\* Vide Hunter's Venereal Disease, page 344.



This opinion, the ingenuity of which I have always admired, requires some explanation. The concise manner in which it is expressed, has prevented it from being fully understood ; but with some addition to his theory, I imagine it will at once account for the action of Mercury on the venereal disease, and correspond perfectly with the opinion I have advanced respecting that virus.

Mr. Hunter's theory is founded upon this fact, that the human body is capable of being irritated in a great variety of ways, and that different irritations produce different actions.

For example, cantharides, vitriol of copper, the venereal and variolous matter, all irritate the body in different ways, and a different kind of action takes place in the body to alleviate each of them. Although it seems extraordinary, that every irritating substance should affect the moving fibres

fibres in a different manner; yet it must be acknowledged, that, extraordinary as it seems, it corresponds with many facts respecting the nerves.

The exquisite nicety with which the nerves are enabled to discriminate sensations, is wonderful. The gustatory and optic nerves discover different flavours and tints in almost every substance in nature. The olfactory nerves shew an astonishing delicacy in distinguishing the different scents of the invisible effluvia floating in the air; and the auditory nerves are variously affected even by tremours and vibrations of the air itself.

It is therefore perfectly consistent with, and in some measure analogous to these facts, to admit, that irritating substances should excite the body in different ways, which must proceed from differences in the minute constituent particles of the different substances.

As

As irritations of different kinds are excited, it is natural to believe, that the actions in the body which are produced in consequence of those various irritations, will likewise be of various kinds. But, although the actions differ in some respects, yet they have probably all one common object; namely, to throw off the irritating substance, or relieve the body from its influence.

In the venereal virus, therefore, the supuration and ulceration are considered as efforts of nature, to throw off the irritating substance.

The reason of their failing is, that the virus produces such an action in the vessels, that they form venereal matter. But whether this is the reason or not, the sore does not usually heal of itself, but goes on spreading. Mercury, however, when applied to the sore, is often found to stop the progress of the ulceration, and speedily to heal it.

This

This is the fact to be explained. According to Mr. Hunter's theory, the explanation is, that the Mercury irritates the part which is already irritated by the venereal virus ; and that, in consequence of this double irritation, the nature of the excitement is completely changed. Either the part is rendered insusceptible of the venereal irritation altogether, so that only the mercurial irritation remains ; or else the two irritating substances, Mercury and Venereal Virus, cause a third species of irritation different from either.

Whichever of those modes is thought most probable, the nature of the irritation is certainly changed, and the action of the living body must be changed likewise, and of course the sore becomes quite of a different nature.

The species of sore produced by Mercury happens to be mild, and easily disposed to heal, and therefore it granulates and cicatrizes.

It

It is in consequence of this, that the most stimulant mercurial preparations generally succeed best in curing venereal sores. Red precipitate, and solutions of corrosive sublimate, answer better than mild mercurial ointment.

It has also been found, that other stimulants besides Mercury sometimes can cure chancres, particularly verdigris, vitriol of copper, lunar caustic, and burnt alum. These substances accomplish this, in the same manner as Mercury; that is, by exciting the moving fibres, and altering the nature of the stimulus.

It is not to be conceived, however, that all irritating substances will constantly cure a chancre; many of these which have been mentioned, on the contrary, often increase the ulceration, and are therefore dangerous. The mercurial stimulants sometimes have this effect, as well as the others; which is owing to some peculiar state  
s of

of the moving fibres, and is not much to be wondered at. For we know that common ulcerations which are not venereal, often spread with great violence.

One might naturally imagine *a priori*, that the application of stimulants to chancres would always make them spread. And it is rather surprizing, that the excitement of Mercury and virus combined does not always cause a greater ulceration, than the virus alone. But as the ulceration is an effort of the *Vis Medicatrix Naturæ*, to throw off a noxious substance, it is not excited altogether in proportion to the irritation, but rather perhaps proportionally to the danger.

The application of many stimulants being less dangerous to the constitution than the venereal virus, does not therefore occasion so great an alarm, although the pain and irritation they produce is very great. Red precipitate, when put upon a chancre, although



though it irritates and makes the sore smart, often favours the healing, because it prevents the more baneful excitement of the virus.

Upon the whole, the opinion of Mr. Hunter appears to be rational, and analogous to what we know of the operations of the animal œconomy in other instances.

But the above is only an explanation of the manner in which the local application of Mercury cures chancres. Much remains still to be accounted for; as it is well known that Mercury, when thrown into the blood, will likewise make a chancre heal up, although no application whatever is made to the sore itself; and not only heals the sore, but prevents any return of the disease. This manner of healing the sore is generally supposed to be owing to the Mercury's being brought to the chancre in the course of the circulation: which, however, appears very improbable, for two or three grains of corrosive sublimate taken internally

in the course of a fortnight will sometimes cure a chancre.

When we consider the smallness of the quantity thus diffused through the whole mass of blood, and how very minute the portion of the medicine must be that can possibly be carried to the chancre, (if ever any arrives there,) it must, I think, be absurd to imagine that so minute a particle touching the chancre for perhaps only an instant can produce a cure.

Dropping this opinion as incredible, let us reflect a little on the cause of the chancre's spreading, and we may be led perhaps to a more probable explanation of its healing.

It has been already shewn that the chancre is produced by irritation. Irritability is a property of the moving, or muscular fibres only; for no other are capable of contracting.

It was once thought that the power of contraction in the muscular fibres was derived entirely from the brain, and conveyed

veyed to them by the nerves ; but it is now well known that muscular fibres have a *vis insita* of contracting, even when a muscle is rendered paralytic, whether by the nerves being cut, or rendered incapable of their office by disease. This power is most conspicuous in the involuntary muscles, and particularly in the muscular coats of vessels. Something of a similar power exists even in vegetables, although there is certainly no such thing as a nervous power in any vegetable, nor indeed can any be discovered in some of the lowest orders of the animal creation. Yet the vessels of both are endowed with a power of acting, by which they take in nutriment, propel their juices, increase in growth, multiply their species, and produce fruits, flowers, and seeds.

It is in consequence of this power that the sensitive plant shrinks from the touch ; and that the oyster, upon the least impression,

pression, contracts that muscle which closes its shell. It is likewise from this power, that, when any injury is done to those animals or vegetables, actions take place in their vessels to remedy the injury.

Various are the causes which excite this power in the muscular fibres. Heat and many other impressions have this effect; but we are too ignorant of the mechanical structure and chemical properties of those bodies, to have any idea of the mode in which those causes produce the above effects.

But it was not enough for man, or even for most animals, to have this power only. Another principle of action was requisite to fit them for the complicated duties they were intended to perform. A brain and nerves are therefore given, in which is resident the quality of sensation, and a power of control over the muscular fibres.

This last power does not annihilate the one formerly mentioned; for the irritable  
continues

continues to exist, even when a part is deprived of the nervous power.

Muscular fibres in man, and all the more perfect animals, may therefore be excited to act, either by rousing the irritable, or nervous principle.

To bring all this discussion to the point originally in view, we are to consider upon which of those principles the Venereal Virus acts. It seems to me probable that it acts chiefly, if not altogether, upon the irritable principle. For Venereal Virus occasions no pain when applied, and none is ever felt till inflammation takes place. Cantharides likewise appear to act chiefly upon the irritable principle, because although they give a great deal of pain, yet it is not till inflammation has taken place. The uninflamed nerves seem not to be capable of conveying the stimulus of the Cantharides. And when a blister is applied to a paralytic limb, where the nerves do not perform

form their office, it excites inflammation, as in a sound part.

It seems then probable, that Venereal Virus excites inflammation from stimulating the irritable, but not the nervous principle ; and although the experiment will never, and certainly ought never, to be tried, yet it can hardly be doubted that if Venereal Pus was applied to a paralytic limb, or any part from whatever cause deprived of nerves, it would excite a chancre in the same manner as when applied to a part where the nerves are entire. If it is admitted that the Virus acts upon the irritable principle, it may seem probable that the medicine which counteracts the Virus, likewise acts upon the irritable principle. But this is by no means certain ; because, as the nerves have a control over the muscular fibres, impressions made upon the brain may tend either to diminish or augment the action of the muscular fibres.

Mercury,



Mercury, most probably, acts both upon the irritable and nervous principle. When applied locally, it operates chiefly upon the irritable principle; but when it produces its effects in consequence of circulating in the blood, it must chiefly act upon the brain; for the irritable principle can only be affected by the Mercury's coming into contact with the part diseased. But the quantity of Mercury thrown into the habit is often so small, and being diffused through the whole mass of blood, so little can ever reach the chancre, that it is quite incredible, as was already said, that the healing of the sore should be produced by its contact.

But the nervous principle may be affected more easily; for a very considerable proportion of the mass of blood which issues from the heart is sent to the brain. Haller thinks not less than one sixth part of the whole; and, in consequence of this, a very great effect is produced upon that organ,  
which

which occasions considerable effect upon the whole constitution. A variety of symptoms are therefore produced ; all of which, in all likelihood, are efforts in the constitution to get rid of the Mercury ; a new disease is therefore stirred up in the body, and a stop is put to the ulceration which was going on from the irritation of the Venereal Virus. The whole powers of the body are affected by the Mercury, which is a new poison introduced : the actions of the constitution are entirely turned to the expulsion of it, and the parts become insensible to the irritation of the Venereal Virus. The sore of course heals.

It is well known, that chancres generally stop spreading, or heal up, whenever the patient catches a fever. This depends entirely upon the principle which has been mentioned ; namely, that the actions of the body are totally altered by the superior irritation which occasions the fever. But chancres will not always heal when there is  
a fever,

a fever, for they do not always heal even in consequence of the exhibition of Mercury; and the sore sometimes remains open long after the Venereal Virus is thoroughly extinguished, owing either to the indolent or diseased state of the vessels of the part, or to some vice in the constitution. Local and general remedies of a different kind are in these cases requisite to make the sore heal up.

We have hitherto treated of the action of Mercury upon the solids only, we now proceed to make some observations upon its action on the fluids.

It was formerly observed, that the Venereal Virus produces something like fermentation in the fluids: no permanent cure can be accomplished, therefore, without this fermentation is stopt. Mercury certainly has the power of stopping this fermentation: but this cannot be effected by any chemical  
3 change

change being made in the blood, simply by its mixing with the Mercury which is diffused through it. For the fermentation is sometimes stopt, and the cure completed, by so very small a quantity of this medicine, that we cannot help thinking that these effects are produced by some other cause than the mere mixture of so minute a quantity with the whole mass of blood. But Mercury, when thrown into the body, acts upon the brain, and always produces more or less of a fever, which certainly occasions a considerable alteration in the blood. The blood of those who are under a severe course of Mercury is generally fizy as in those of most fevers.

The alteration which takes place, whatever is its nature, appears to put a stop to the Venereal fermentation.

Mercury, therefore, both remedies the irritation of the Virus, and prevents its increase.

There

There is still one circumstance unexplained ; namely, what becomes of the Virus which is circulating in the blood.

This, I imagine, is thrown out of the blood by some of the excretories, as other extraneous substances are. Without this the Venereal disease could never be permanently cured ; for the symptoms would recommence soon after the exhibition of the Mercury was stopt.

I have now given my notion concerning the action both of the Venereal Virus, and likewise of its antidote Mercury. In the greater number of points I agree with Mr. Hunter : and many of the ideas I have suggested are a farther extension of his theory.

But there is a peculiar opinion given, and a practical inference made from it, in Mr. Hunter's work, which I cannot agree with \*. He asserts that, when the Venereal Virus has contaminated the body,

\* Hunter on the Venereal Disease, page 305.

a disposition to the venereal disease may take place in a great variety of parts: and further, that this disposition is different from action, and that where a disposition only has taken place, but before action has begun, if a course of Mercury should be given, and continued for ever so long a period, it will never remove the disposition, but that the disease will begin as soon as the effects of the Mercury have ceased. This idea will be better understood by an example.

Suppose a person has contracted a chancre, and that his body is thoroughly contaminated by the absorption of the matter. Mr. Hunter is of opinion, that a disposition to the venereal disease may take place in the throat, skin, and bones very soon, although it requires a more considerable time before the disease in these parts comes into action. And that if Mercury is given when there is no other symptom but the chancre,



chancre, it can only cure the chancre, but not the disposition for disease, which has not yet come into action in the throat, skin, and bones. Mr. Hunter therefore imagines, that after the Mercury is stopt, although it has cured the chancre, the disease will begin in the throat.

If a second course of Mercury is given, it will cure the throat, but not the disposition, which is not yet come into action in the skin and bones.

A third course of Mercury may become necessary to cure the skin, and perhaps a fourth to cure the bones.

And, to illustrate this theory, he gives a case where three courses of Mercury were actually necessary.

I confess, for my own part, I do not comprehend the meaning which is given to the word disposition here. If a disease has not begun actually to act in a part, I do not see

see how that part can be disposed to disease more than any other part.

Action must either have taken place, or not ; if it has taken place, there is disease ; if not, there is none. I have no conception of any intermediate state. What is named disposition, appears to me impossible ; for no part of the body is disposed to disease, although all are susceptible of it.

The Venereal Virus may remain inactive for a long time, but if it excites any thing, it must be action.

The human mind is, to be sure, capable of being disposed to act ; but parts of the body which are not endowed with intelligence, can neither be capable of being disposed to act, or being disposed to cease acting. They are only capable of being excited to action. In fine, to have a disposition for any thing, is a quality not belonging to common matter, it is peculiar to intelligence. But, although

though this notion concerning disposition does not appear well founded, yet it might still be true, that the Venereal Virus cannot be extirpated until it has begun to act; and that when a person has the Venereal Virus circulating in the blood, it might be impossible to extirpate it until the disease has begun to act on the body; that is to say, till the symptoms have appeared.

This opinion, which has been lately entertained by many, is founded upon cases where fresh symptoms have recurred, after the disease has been supposed cured by a long continued course of Mercury.

Nothing, however, can be more inconsistent with what we perpetually observe of the venereal disease, than this notion. For it plainly appears in almost every venereal case, that Mercury does prevent mischief taking place from Virus circulating in the blood. For example, in a case of chancre, or rather in one where a suppurated bubo

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has

has been dispersed, and the matter absorbed and thrown into the blood, a course of Mercury continued for a proper length of time, will almost always prevent this infection from ever causing any future symptoms of disease.

It is evident, that in these cases, and indeed in almost every case whatever, Mercury prevents the morbid effects of Virus, which is in the habit, but not yet come into action. Indeed, if Mercury had not this power, it would be of little use. For, if every particle of Virus began to produce disease, before the infection could be expelled, no man once infected could ever be cured. The constitution of the strongest would be ruined, and his life terminated, before all the particles of Virus absorbed from a chancre or bubo could successively come into action, and be destroyed by the same number of courses of Mercury.

To

To obviate this objection, Mr. Hunter conceived the theory respecting disposition, which has already been taken notice of; and he imagined, that Mercury could prevent a disposition forming, although it could not cure it when formed.

Mercury is therefore a specific to the Virus, both before a disposition to disease has arisen, and after it has terminated, but not during its operation.

These opinions do not strike my mind as probable; it appears to me, that the few cases, where the venereal disease returns after a thorough course of Mercury, may be accounted for in a much more natural manner; namely, that the Mercury was stopt before all Virus was thrown out by the excretories; which it would certainly have been, and the disease quite extirpated, if the medicine had been continued longer.

It is proper here to observe, that such cases do sometimes occur, without any just

blame being imputable to the surgeon. Because, as there is no symptom by which a surgeon can judge with certainty when the Virus is entirely thrown out, he can only act according to some general conjecture, and consequently sometimes will be mistaken. From the very nature of the excretions, it is evident, that sometimes a longer and sometimes a shorter period is necessary for the expulsion of the Virus. Accordingly we sometimes find a slight mercurial course of two or three weeks sufficient for the cure of a chancre, and eradicating the infection for ever; whereas, at other times, the disease repeatedly recurs, after the Mercury has been given in large doses for as many months.

If the idea which I formerly advanced is admitted, respecting the augmentation of the Virus by some process like fermentation, it will explain many particulars relating to the cure of the disease.

It



It is well known in general, that the longer this disease continues, the longer course of Mercury it requires. A recent chancre is cured usually sooner than secondary symptoms. Because, in the chancre, little or no fermentation having taken place in the blood, the small quantity of Virus absorbed is soon thrown out of the habit by the excretories.

But in the secondary symptoms, as the body must have been contaminated for a longer time, and the Virus have affected various parts of the solids, and augmented in the fluids; of course, a longer exhibition of Mercury is necessary before it can be entirely evacuated.

It was already observed, that the Virus can be thrown out without any of the natural evacuations being increased. And this method is the only one which can be adopted in persons who are extremely debilitated. But, when Mercury is given in such small

doses, as to produce no sensible evacuation, it is necessary to continue its exhibition for a proportionably longer time.

It is not ascertained by which of the excretories the Virus is thrown off. But there is a strong probability that it is by the perspirable vessels chiefly.

Sudorifics were once the only method known for alleviating this disease; and it is strongly attested, that cures were sometimes effected by these means, particularly by the guaiacum. It is at present generally admitted, that warmth contributes to the extinction of the disease. A confirmed Lues is, on that account, cured with more certainty in summer than in winter, in a warm than in a cold climate.

For the same reason, in obstinate secondary causes, it is proper that the patient should be clothed in flannel, that his chamber should be kept warm, and that he should use the hot bath occasionally. Di-

luting and diaphoretic drinks ought to be exhibited during the mercurial course, and the strength of the patient is to be supported by wine, and a proper regimen. By this treatment every vestige of disease has been extirpated, in cases which have resisted repeated courses of Mercury given without the same management.

## OF EXPECTORANTS.

THERE is perhaps no country where coughs are so frequent as in Great Britain ; which is generally imputed to the excessive variableness of the climate. But this cause seems to have no ill effect on the health of wild animals, who are exposed to the same uncertain weather. Horses, and a few domestic animals, are alone subject to this ailment, who are stabled in warm buildings, or tended with human care.

The variableness of this climate (which we hear so much of) does not prevent many vegetables and animals from arriving at their utmost perfection. In these islands, the oak, the eagle, the horse, and man, are not inferior to those produced in countries where the weather is softer or more constant.

The

The blooming complexions of the peasantry with which foreigners are so much struck ; the permanence of their good looks, and their strength and activity, strongly shew, that the climate is not unwholesome to those properly educated. Strangers, however, often suffer by the sudden transitions from heat to cold, and from dry to moist, which are so frequent. And those natives suffer likewise, who are delicately brought up, and who, from being generally confined in warm apartments, seldom feel the natural temperature of the air ; and acquire in this northern region, constitutions adapted to Italy. Such natives, and their descendants, are perpetually endangered by the vicissitudes of the weather. They acquire catarrhs, pleurifies, consumptions, sore throats, fevers, and other diseases. But these ailments ought rather to be imputed to a delicate constitution acquired by an improper mode of life, than to the climate.

climate. Besides, the vicissitudes of the weather cannot be prevented, but it is very possible to bring up a child in such a manner as not to suffer from those vicissitudes.

An infant who is born strong, with all his organs perfect, if hardily brought up would be nearly as little injured by the changes of the weather, as a young fox. This is the case with savages who live in huts, and are slightly covered. But the manners of polished life make it impossible for parents to harden the bodies of their children to an equal degree; they must live in houses, and adopt the dress and mode of life of their countrymen. But although the inhabitants of these islands cannot be hardened like savages, yet they need not be rendered effeminate and sickly.

A healthy child should, from its birth, be plunged in cold water every morning. Russian mothers wisely rub the bodies of their children even with snow. In the day-  
time



time they should be as much as possible in the open air, whether the weather is good or bad. Nurses, more indulgent to themselves than anxious for the welfare of the children entrusted to their care, will not venture out in bad weather. But if the child is to be considered, and if it is wished to give him something better than a sunshine constitution, he ought to be almost constantly out of doors, whether the weather is wet or dry, hot or cold. By this mode of life, the child will be enured and accustomed to all the changes of this uncertain climate, and will rarely suffer from them.

The use of linen, now so general, seems to me a great cause of the diseases which have been mentioned, and of many others. Linen was originally brought from the South-East; and is a species of dress proper perhaps for that sultry climate, but not at all for this. It has a strong attraction for  
moisture,

moisture, consequently absorbs the perspiration : and therefore, when once moistened, it with difficulty dries ; but remains cold and damp upon the skin, checking perspiration, and chilling the body.

Flannel, and every kind of woollen cloth, have, on the contrary, no attraction for moisture.

This is proved by plunging them in water. When a piece of linen is dipt in water, it instantly becomes thoroughly wet, and absorbs the moisture like blotting paper. But when flannel is dipt in water, it does not absorb the moisture in the same manner. Some globules of water indeed remain adhering to the flannel, most of which may be shook off like drops of dew from a cabbage leaf.

This repulsion of woollen cloth to water renders it a much wholesomer clothing than linen. For instead of becoming wet, and absorbing the perspiration, it suffers that  
vapour

vapour to pass through it without moistening it.

The advantage of this is great, as flannel generally remains warm and dry upon the body. If, however, a profuse sweat breaks out, both the skin and the flannel must undoubtedly become wet. But even when this occurs, no very sudden check is given to the perspiration. For the spongy texture of the flannel renders it a bad conductor of heat. The body therefore continues warm, and the sweat dissipates by degrees.

Linen, on the contrary, when wet with sweat, chills the body suddenly. It is a smooth substance, of a compact texture, and consequently a powerful conductor of heat. A considerable degree of cold is likewise produced by the evaporation of the moisture. The body is therefore robbed of its heat very fast, an immediate check is given to all perspiration, cold shiverings

take place, and many troublesome and dangerous diseases frequently ensue.

These ill effects would be often prevented, and many valuable lives would be annually saved, if the inhabitants of this climate universally wore woollen, instead of linen, next their skin. This is requisite through the day only. Linen will do equally well at night, and perhaps is more agreeable to sleep in. For our bodies are so well covered, that there is little danger of catching cold in bed.

The plan of wearing flannel is by no means inconsistent with that of rendering the body hardy. For if our bodies are to be covered, it ought not to be done with a substance which has the quality of chilling us as often as we take exercise. The coverings of animals, bestowed upon them by nature, have not this injurious quality. Their furs, wool, and feathers, are smeared with oil, which throw off moisture.

Was

Were the use of flannel more universal, I am persuaded we should have less occasion to treat of the class of medicines which are now to be considered. For there are no complaints more frequently induced by catching cold, than coughs; and expectorants are remedies which are supposed to alleviate this disease. Dr. Cullen gives the following definition of this class of medicines; namely, “those which render the contents of the bronchia to be more easily brought up\*.” He rejects the common theory upon this subject, that expectorants act as *incidentia et attenuantia*; and he mentions, that, respecting their action, “the only explanation that I can find probable is, that by increasing the secretion of the liquid that is to afford a mucus, this, as poured from the arteries into the follicles, being always a thin fluid, it may dilute the mucus in the follicles, and may make it to be poured out from these in a

\* Dr. Cullen's Mat. Med. vol. ii. p. 455.

“less

“ less viscid state, and may thereby render  
 “ it more easy to be brought up by cough-  
 “ ing \*.” This explanation, which Dr. Cul-  
 len gives without laying much stress upon  
 it, is certainly far more rational than that  
 which he rejects.

Yet if we consider the nature of those  
 complaints which are benefited by expec-  
 torants, I suspect that this opinion must be  
 given up likewise.

The internal surface of the bronchial  
 vessels, and cells, secrete a fluid. In com-  
 plete good health, this fluid is carried off  
 by the breath, and by absorption, only  
 enough being left to keep the surfaces moist.  
 But if there is a disorder in the lungs oc-  
 casioning the secretion of an unusual quan-  
 tity of this fluid, an accumulation takes  
 place which irritates, and is brought up by  
 coughing.

The mucus of Sneyder's membrane,  
 namely, that membrane which lines the

\* Dr. Cullen's Mat. Med. vol. ii. p. 457.



nose, is apt to accumulate from the same causes, and it is removed by similar means. For blowing the nose is performed on the same principle with coughing. In the first place, a full inspiration is made; the nose is then pinched to lessen the capacity of the nostrils, and the air being forced suddenly through these narrow passages, clears them entirely of their contents.

In coughing, the muscular fibres, forming a part of the bronchial vessels, contract, in order to lessen their diameter; and the air is thrown out in a convulsive manner, and carries with it the phlegm, mucus, or whatever extraneous substance the bronchiæ contain.

An increased secretion of phlegm is a very frequent and troublesome complaint; it is named catarrh. The secretion is at first thin, and the cough is extremely distressing and frequent. But in proportion as the disease abates, the mucus not only lessens

in quantity, but becomes of a thicker consistence. This is a circumstance applicable to all discharges whatever. The pus, or discharge from ulcers, Sneyder's membrane, the bronchia, urethra, and other membranes, when inflamed, is always extremely thin when the inflammation is violent, and becomes thick and less in quantity as the disease goes off.

I have observed, likewise, that when the phlegm, or pus in the bronchiæ, is thick, it is coughed up with more ease to the patient than when it is thin. I read in books, and hear in conversation, a great deal concerning the difficulty of expectorating tough viscid phlegm ; but, from my own observations, and from questioning many who are subject to coughs, I have learned, that it is more difficult to expectorate thin phlegm, or pus, than thick. And the reason is obvious, a thin fluid eludes the impulse of the air ; whereas a thick substance

stance makes resistance to the air behind, and consequently is propelled according to the common laws of mechanics. A solid body, if not closely wedged in, would, for the same reason, be more easily expectorated than thick phlegm.

If I am right in these observations, it ought never to be our plan to render the phlegm thin, we should rather endeavour to make it thick : and if we succeed, our patient will not only cough with less violence, but will have the additional satisfaction of knowing that his complaint is abating.

It was from the habit of seeing surgical cases that I made this reflection. Every surgeon knows, that as long as the discharge from an ulcer, or the running from a gonorrhœa, is thin, there is no possibility of healing up the sore, or stopping the running. He therefore exerts his whole art to procure a thick secretion, as the only means of producing a cure.

The same is exactly applicable to the secretion of the lungs; and if physicians made it a rule to study surgery likewise, they might draw much useful information from this sister art.

There are no medicines which act upon the lungs only. When a medicine is swallowed, it must either produce its action upon the nerves of the stomach and intestines, or be thrown into the mass of blood and affect the whole body. All medicines which have a tendency to diminish the secretion of mucus in the lungs, must likewise be useful in similar affections of other parts.

Catarrh, being an inflammatory state of the internal surface of the bronchiæ, and usually produced by a check given to the perspiration, is to be remedied chiefly by sweats, vomits, and what has been named the antiphlogistic regimen. Inhaling warm vapour is likewise beneficial. But the chief  
means

means of cure is continuing constantly in a warm chamber, and being warmly clothed.

As the frequent coughing is extremely troublesome, it is usual, likewise, to recommend sweet, oily, and mucilaginous substances, with a view to diminish the coughing. This was taken notice of when treating of demulcents.

But by far the most powerful means of lessening the frequency of coughing, is the exhibition of those substances which were treated under the title of Narcotics. Opium gives the greatest relief: æther has considerable powers on some constitutions, and camphor on others. These substances act by lessening the irritation which is produced by the extraneous substance in the bronchiæ. The patient, therefore, instead of coughing every five or ten minutes, will not be excited to cough above once in two or three hours. This diminution of the



cough gives the patient the greatest comfort, and favours exceedingly a total removal of the complaint. For the act of coughing, by the contracting of the bronchial vessels and the concussion given to the lungs, has a bad effect. I have observed, however, that narcotics do little or no good, when given at the commencement of a cough; the high inflammatory symptoms ought to be first overcome by other means, and they may then be given with great advantage.

Although the medicines which I have hitherto mentioned, have certainly considerable effects in lessening coughs, and relieving expectoration; yet no writer has ever given them the name of expectorants. This title is bestowed upon a different set of medicines, chiefly of a stimulating kind. Dr. Cullen has given a list, and he mentions a number of them, in complaisance to the writers of the *Materia Medica*,  
(as



(as he says,) although from his own experience he could not find them useful.

The only medicines which he thinks at all deserve the name of expectorants, are the *Nicotiana* and *Scilla*.

As the powers of these remedies are very different from those of the remedies which I have before taken notice of, it becomes necessary to give some explanation of this matter, lest it should be imagined that opposite kinds of remedies are recommended in the same disease.

There are two stages of a cough; first, an inflammatory one, and after that is past, there occurs sometimes a chronic stage.

In the first stage, those remedies are chiefly useful which tend to lessen inflammation. But the second stage is of a very different kind: all acute inflammation is past, and the vessels of the bronchiæ appear

to continue the secretion of the phlegm from some want of power to recover their healthful state. This complaint is therefore to be treated much in the same manner as an old gleet: that is to say, by corroborants and stimulants. The balsams which cure gleets, likewise often stop expectoration.

Myrrh and ammoniacum are also often found serviceable. Bark and other tonics have been sometimes exhibited with the best effect. And I know a gentleman who finds that the only way by which he can live free from a most distressing cough, is by bathing in the sea, and living on the coast.

Upon this view of the subject, it is evident that there are a vastly greater number of medicines that relieve, or rather diminish, expectoration, than tobacco or the sea-onion. I have enumerated several, but there are  
many

many more. For all tonics, and many stimulants, have been found serviceable in obstinate chronic coughs. Mercury especially has, in some instances, produced a cure.

## OF E M E T I C S.

**N**OTWITHSTANDING the great variety of substances noxious to the human constitution with which nature abounds, yet mankind are in little danger of being tempted to swallow any of them, as such substances are generally disgusting.

Among vegetables, there are very few exceptions to this observation; and although there are more among minerals, this produces little inconvenience, as no mineral, except water, forms any part of our aliment. Nature, however, has not trusted entirely to the general disgust of mankind to poisonous or improper food, but has been so provident as to endow the human stomach with the power of throwing it up, when, either from inadvertency or design, any thing of that kind is swallowed.

But,

But, it is not unwholesome substances alone which excite vomiting; even the most innocent kind of food has this effect, if too large a quantity is swallowed; which preserves men from some of the bad consequences, of indulging their appetite to excess. And even those substances which are of a sedative nature, and which, in a moderate dose, repress vomiting, are very apt, when taken in a large dose, to produce it.

Dr. Cullen does not attempt to give an explanation of the principle upon which any substance, except warm water, excites vomiting. When a large quantity of this fluid is swallowed, it generally proves emetic; and this he accounts for in the following manner\*. “Nature has provided, “that, on every distension of the stomach, “the pylorus should be raised up by the longitudinal fibres, which, in the small curvature of the stomach, pass between its

\* Dr. Cullen's *Materia Medica*, vol. ii. p. 471.

“ two orifices, and at the same time be con-  
“ tracted by the muscular fibres placed in  
“ the duplicate of the coats of the stomach,  
“ formed near to the pylorus. This con-  
“ striction in ordinary cases is moderate;  
“ but we know it can be so strong, as to  
“ shut up that orifice entirely: and it is  
“ probable that this, as seems necessary,  
“ should always happen in vomiting. It  
“ is also probable, that this contributes to  
“ occasion the vomiting; as *this constriction*  
“ *of the pylorus must invert the peristaltic mo-*  
“ *tion of the stomach, and direct it entirely*  
“ *upwards, even to a vomiting.* If it can  
“ therefore be supposed, as I think it may,  
“ that the sudden distension of the stomach,  
“ by a large draught of warm water, can  
“ induce a strong contraction of the pylo-  
“ rus, we shall readily understand how it  
“ produces vomiting, and, at least, contri-  
“ butes to promote it.”

In



In this quotation, Dr. Cullen endeavours to shew, that from the arrangement of the muscular fibres of the stomach, whenever this organ is suddenly distended, the pylorus is probably contracted. The fact I believe is, that the pylorus is not only contracted when the stomach is distended suddenly, but likewise when this happens gradually. It is indeed probable, that this orifice is never relaxed, except when the stomach contains aliments which have been digested, and require to be thrown into the intestines.

The contraction of the pylorus cannot however, as Dr. Cullen supposes, occasion vomiting. It may indeed, as he says, contribute to promote it; but it cannot alone produce it, or we could never retain any thing in our stomachs an instant. Vomiting is a very complicated action; it is caused not only by the contraction of the pylorus, but of every part of the stomach,  
except

except the upper orifice or cardia. The diaphragm, the intercostal and abdominal muscles, greatly contribute to produce the effect, and almost every muscle of the body partakes of the action.

So general an effect cannot proceed from so inconsiderable a cause as the arrangement of the muscular fibres of the pylorus. It must proceed from some extensive principle.

Emetic substances have another quality, beside that of exciting the stomach to evacuate its contents ; they frequently occasion a great increase of perspiration.

This effect was not overlooked by Dr. Cullen ; and the use which is made of it in the treatment of fevers and other diseases, has occasioned a very remarkable change in the modern practice of physic.

I shall transcribe the passage where Dr. Cullen gives the theory of this effect.

“ Thus we are of opinion\*, that there is  
“ a *special consent* between the stomach and  
“ vessels on the surface of the body, so that  
“ the several states of these are mutually  
“ communicated to one another; whence  
“ the action of vomiting excites particularly  
“ the action of the vessels on the surface of  
“ the body, and may thereby be of use in  
“ restoring the tone, and overcoming the  
“ spasm, of the extreme vessels which take  
“ place in fevers.”

Dr. Brian Robinson entertained an opinion diametrically opposite to the above. He imagined that vomiting occasioned a constriction of the extreme vessels every where; and, in consequence of that opinion, he recommended Emetics in hæmoptysis: whereas Dr. Cullen thinks, that Emetics remove constriction or spasm.

\* Dr. Cullen's *Materia Medica*, vol. ii. p. 446.

Mr.

Mr. J. Hunter gives an opinion respecting the use of Emetics in the hernia humoralis, which seems very remarkable.

He thinks \* that there is a sympathy between the stomach and testicle ; just as Dr. Cullen imagines, that there is a sympathy or consent (for these two words are synonymous) between the stomach and the vessels of the skin. But to Mr. Hunter it seems probable, that in consequence of this sympathy, vomiting *decreases* the action of the vessels of the testicle, whereas Dr. Cullen imagines that from the same sympathy vomiting *increases* the action of the vessels of the skin.

It is painful to observe these eminent men entertaining such opposite opinions. Their theories are so contradictory, that it is impossible to reconcile them. One or all of them must be erroneous.

\* J. Hunter's Ven. Disease, p. 91.

To explain the sweating powers of Emetic substances, by the hypothesis of a sympathy between the stomach and the vessels on the surface of the body, is to my mind extremely unsatisfactory. But, if the hypothesis was admitted, why do not all other Emetic substances excite sweating, as well as ipecacuanha and antimony?

The squill and digitalis are likewise Emetics; yet small doses of them, instead of being sudorifics, are diuretics.

Is this to be accounted for, by supposing another sympathy between the stomach and the vessels of the kidneys? And are we to explain the salivating powers of mercury, by supposing a sympathy between the salivary glands and the stomach and skin?

As the term sympathy may be thus extended to explain so many difficulties, it seems inadequate to explain any.

Previous to any attempt to discover the

principle of the action of Emetics, I shall describe their effects with all the accuracy I am able, and see if any reasonable and consistent explanation can be deduced from observing these effects.

When a moderate dose of an Emetic is swallowed, after the disgust proceeding from the taste is past, the stomach remains for some time undisturbed: But within twenty minutes, a half, or a whole hour, an uneasy sensation and nausea commence. These sensations come and go, the sickness on the whole increasing. There is likewise often pain felt in the head, slight rigours take place in various parts of the body, the pulse becomes weak and irregular, but generally slow; the face and lips grow pale; the eyes lose their lustre, and the countenance appears dejected. After these symptoms have continued for some time, the nausea increases to the utmost height, and vomiting begins.

During



During the action of vomiting, the body is very violently agitated; the straining is attended with a great deal of pain both in the stomach and head; the face and eyes become red, all the veins appearing turgid with blood; a sweat breaks out upon the face and other parts of the body, and the pulse is quick and strong.

The vomiting usually intermits after two or three fits of reaching, and all the violent symptoms go off; leaving the patient in a languid state, and oppressed with sickness. After short intervals there are usually two, three, or more attacks of reaching, with the same symptoms as the first. At last the vomiting entirely ceases, though the nausea continues some time longer, the pulse being weak and slow, and the patient feeling himself almost exhausted, and drowsy.

Such are the usual symptoms which follow the operation of Emetics in general;

but there are others attendant on particular Emetic substances. When the reaching ceases, for example, after an antimonial vomit, the pulse becomes strong and frequent, the skin hot, an universal perspiration generally breaks out, and sometimes a purging occurs. When the squill Emetic is taken, instead of these effects, a considerable increase of the secretion of urine usually follows: But whichever kind of Emetic has been given, after all the evacuations have ceased, the patient feels considerably debilitated, and his pulse is a good deal lowered.

It was observed that Emetics seldom excite any sensation in the stomach for some short period after they are swallowed. This is perhaps owing to the mucus on the internal surface of the stomach preventing the Emetic from immediately coming into contact with the nerves. Nausea or sickness  
is

is a sensation peculiar to the stomach, of an uneasy nature ; but so different from pain, that it seems in some degree another sense. The stomach is susceptible of pain, however, when injured or inflamed. But nausea is produced by a set of substances which have no power to injure the stomach either mechanically or chemically. It is an impression felt by the nerves of the stomach, as flavours and tastes are perceived by the nose and tongue. As the stomach is susceptible of those two sensations so different from each other, it would be curious to know whether both are conveyed by the same set of nerves. The stomach receives nerves both from the *par vagum* and *intercostales*. It seems not impossible that the sensation of nausea is conveyed only by the branches of the *par vagum* which arise immediately from the brain ; and that the more common sensations proceed from the *intercostales*.

But, however this may be, a considerable number of substances produce nausea, and an inclination to vomit.

It is not to be expected that any explanation can be given of a sensation. There must be, however, some reason why our stomachs are made susceptible of this sensation; and all Emetics must possess some common quality by which they excite it.

It can hardly be doubted but that the sensation of nausea and power of vomiting are given to the stomach for the beneficial purpose of throwing out such substances as would prove detrimental to the body if they remained in it. It is therefore extremely probable that all Emetics possess some noxious quality; which idea is corroborated by this—that if any Emetic substance is given in repeated doses, each so small as not to excite vomiting, they usually occasion a purging; and if the medicine gets into the blood, either by the purging  
not

not taking place of itself, or by its being prevented by the exhibition of sedatives, it then either acts as a sudorific or diuretic.

There seems then strong reason for thinking that Emetics are of a noxious quality, since, as long as they remain in the body, they excite general uneasiness, and considerable evacuations.

Emetic substances do not produce one evacuation, but many; when they are in the stomach, they excite vomiting; when in the intestines, purging; and when in the blood vessels, sweating, or an increase of urine. In short, whenever they get into the body, every effort is made to throw them out. How these evacuations are excited, I know no other mode of explaining than by referring to the *Vis Medicatrix Naturæ*.

This will be considered by many philosophic persons as a very unsatisfactory explanation, and little better than the hypothesis of sympathy; and there is no doubt

that admitting of the *Vis Medicatrix Naturæ* as the cause of any effect, is rather cutting than untying the gordian knot. But although it is not a final explanation, yet it brings it to one common principle, with many other phœnomena which take place in the human body: Just as the floating of cork in water, and the sinking of lead, are said to be owing to gravitation; although gravitation itself is an assumed quality, the cause of which is entirely unknown.

The various symptoms which take place in vomiting are then explained in the following manner.

Emetics are conceived to be substances noxious to the human body. The nausea is a sensation of an extremely disagreeable kind, produced by the application of those substances to the nerves; and, like all other blunt uneasy sensations, occasions a weakness in the pulse, paleness, and debility. The violent exertion of the stomach  
and



and muscles, which afterwards occurs, is an effort of the *Vis Medicatrix Naturæ* to expel the noxious matter; and this effort, like all other bodily exertions, is accompanied with a hurried circulation.

The purging, sweating, and increase of urine, are supposed likewise to be efforts to expel the noxious substance from the intestines or blood-vessels.

After the whole tumult is over, a considerable degree of debility and languor take place: partly proceeding from the evacuation, and partly from that depression which always follows great exertions.

After considering these effects of Emetics, we shall proceed to take notice of their use.

Some physicians have been of opinion, that it is proper for persons who are in good health to take Vomits occasionally. Dr. Cullen disapproves of the *frequent* exhibition of Emetics, having observed that they weakened the powers of digestion:  
and

and yet, he says, that he is “ ready \* to  
“ believe, that the *moderate* practice of them  
“ may be useful, both by its exciting the  
“ activity of the stomach itself, and by  
“ agitating, as Vomiting does, the whole  
“ body.”

I cannot imagine, however, that even the moderate practice of Vomiting can be useful, when there is no disease. I am convinced of no fact more fully than of this, that a person in good health will not improve his constitution in general, nor his stomach in particular, by Emetics; or, indeed, by any other medicine.

The reasons Dr. Cullen has given for the contrary opinion, I confess, have failed to convince me. Indeed, nothing seems less probable, than that any good consequence can follow the exciting the stomach to action in so unpleasant a manner, when that organ is in good order, and conse-

\* Vide Dr. Cullen's Mat. Medic. vol. ii. p. 462.

quently sufficiently active; and, surely, there are a thousand ways of agitating or exercising the body preferable to the convulsive efforts made by Vomiting.

Emetics, however, are of essential service in various diseases. Their most obvious use is to evacuate the stomach when it is too full, or when its contents are noxious. Upon this subject Dr. Cullen has made many useful and important remarks.

This class of medicines are likewise useful on certain occasions, although the stomach contains no noxious substance, or when it is even empty; and these beneficial effects seem to me to depend chiefly upon the power they have of exciting other evacuations, and to the great debility and lowness of the pulse which they produce.

In the ardent inflammatory fever, where the pulse is hard and strong, and the skin hot and dry, an Emetic is often of the greatest

greatest service. It evacuates sometimes both upwards and downwards, and likewise excites sweating; the consequence generally is to lessen the violence of the fever.

In the *Hernia Humoralis*, strong Vomiting generally diminishes the inflammation. I imagine this is owing to the debility and sinking of the pulse, which follow the operation of an Emetic, rather than to the sympathy which exists between the testicles and stomach; and consequently that Vomits are useful in that disease, for the same reason that purgatives and bleedings are.

Emetics are often found beneficial in cases of catarrh and asthma. And this benefit is supposed, by Dr. Cullen, and almost every writer on the subject, to proceed from the compression and agitation which the lungs undergo during the action of Vomiting.

But after reflecting with all the attention in my power upon the subject, it appears evident

evident to me, that although in the effort of reaching, the abdominal viscera are very strongly compressed, yet the viscera of the thorax are either very weakly compressed, or not at all. For while the muscles of the abdomen act, and press its contents upwards, the diaphragm contracts, and presses them downwards; the abdominal viscera are consequently compressed by two opposing powers. But the lungs are so far from being compressed, that they are always distended to the utmost, from the air rushing in to fill the chest, in consequence of the action of the diaphragm. Any one who attends a patient taking an Emetic, may be easily convinced of this; for he will observe, that, previous to the reaching, the patient always makes a full inspiration. It is evident therefore, that when catarrhal or asthmatic patients derive benefit from Emetics, it cannot be owing to their occasioning any compression of the lungs. Indeed, if compression,

pression, or agitation, were beneficial in such cases, coughing would be the most effectual remedy for a catarrh or asthma; for, in the act of coughing, the lungs are compressed strongly.

It is however certain, that Emetics do relieve the above-mentioned complaints; but the relief must depend upon some other circumstances, which I shall attempt to explain.

A strong Vomit not only empties the stomach and duodenum, but likewise the gall bladder and hepatic ducts. After these viscera are completely emptied, the secretion of the various fluids of those parts goes on again with considerable quickness. This may occasion a diminution of the secretion of mucus in the bronchial vessels, and consequently relieve the cough. If sweating, purging, or an increase of urine occurs, the relief will be more considerable; for as asthmatic patients find their complaints



plaints augmented by whatever hurries and augments the force of the circulation, they always find relief from that languor of circulation which follows these evacuations.

Consumptive patients have received benefit from Emetics for exactly the same reasons. The Vomiting, by lessening the force of the circulation, and by occasioning a revulsion from the lungs, must be useful where the inflammation is great; but when there is a formed abscess, or when there are tubercles, it is very evident that Emetics can do no permanent service.

The exhibition of Emetics in hemoptosis, as recommended by Dr. Brian Robinson, I cannot help thinking an extremely dangerous practice. Dr. Cullen mentions, that in one of the instances in which he tried it, the hæmorrhage was increased to a great and dangerous degree. This is perfectly consistent with what has been observed respecting the action of an Emetic; for during the reaching,

reaching, the rapidity and force of the circulation is increased, and a full respiration is made, which must strongly tend to augment the bleeding, and indeed may produce a mortal hemorrhage; and the languor of circulation, which usually occurs after the Vomiting, cannot justify so dangerous a method of producing it, especially as there are other equally effectual and less hazardous means of obtaining the same end.

Before I say any thing of the particular substances which are used as Emetics, I must observe, that there is considerable difficulty in determining what medicines ought to be called Emetic.

It has been already observed, that almost every substance in a certain quantity will excite Vomiting. All our purgative medicines in particular are Emetics in a large dose. Jalap and Glauber's salts produce Vomiting with as much certainty as Ipecacuanha, only a larger quantity is requisite.

This is well known to every practitioner who recollects the difficulty he sometimes finds to keep a purgative upon his patient's stomach.

And as all purgatives in a large dose prove Emetics, all Emetics in a small dose are purgatives. This clearly shews, that they act upon the human body nearly in the same manner, although in different doses; and that the distinction made by practitioners is an arbitrary one.

Those substances which are generally prescribed when the intention is to purge, are named Purgatives; and those are named Emetics, which practitioners commonly order when they intend to excite vomiting. But this distinction is not always adhered to; for it is very common, in giving a purgative, to add a small quantity of one of those medicines which are named Emetics, in order to quicken the operation of the purge. But we never reverse this, and add

to a vomit any purgative ; for the vomiting may be more conveniently increased, by enlarging the dose of the Emetic substance.

The medicines which are chiefly employed as Emetics in this country, are the Ipecacuanha, and Tartar Emetic.

The first is a vegetable substance, being a root brought from Spanish America. The second is a saline preparation of the semi-metal antimony, composed of the reguline part of that mineral, united with crystals of tartar. Of these two Emetic substances, the Ipecacuanha is by far the mildest in its operation ; which is not solely owing to a difference in the dose, because when a dose of Tartar Emetic is given, barely sufficient to occasion vomiting, it almost always operates with violence ; whereas, when the dose of the Ipecacuanha is twice or three times larger than is necessary, it still operates mildly.

The

The Tartar Emetic not only excites a much more violent action on the stomach, but it likewise generally operates either as a purgative or a sudorific, or both; these latter effects are, without doubt, owing to some portion of the medicine not being thrown up during the vomiting.

On the other hand, a dose of Ipecacuanha seldom produces any other effect than vomiting, which probably proceeds from its being usually all thrown up. It must naturally happen, that part of a dissolved salt will be more apt to escape the action of the stomach, than a part of an undissolved powder. For the solution of Tartar Emetic will diffuse itself through the fluids of the stomach so minutely, that if one drop of fluid remains in the stomach, that drop will have some of the Tartar Emetic in union with it. Repeated draughts of warm water being swallowed and thrown up, must always lessen the quantity of Tartar Emetic; but



it will hardly be possible to discharge the whole. Powdered Ipecacuanha will be easier expelled by the action of the stomach, because it does not diffuse itself so minutely as adissolved salt.

This idea is confirmed by a fact mentioned by Dr. Cullen, who is a very accurate observer of the powers of medicines; namely, that the \* powder of Ipecacuanha is a more manageable Emetic than the tincture, because “the tincture often *adheres* longer to the stomach.”

By the expression *adheres*, Dr. Cullen could only mean, that it remains longer in the stomach, and occasions sickness for a longer time than the powder. Because it is impossible for a subtle fluid like white wine literally to adhere. But, as in the tincture, the resin of the Ipecacuanha is in a state of solution, it will be difficult to expel the whole; for the same reason that

\* Cullen's Treat. Mat. Med. vol. ii. p. 475.



it is difficult to expel the solution of Tartar Emetic. But, although the tincture of Ipecacuanha produces a severe and lasting sickness, it seldom occasions much purging or sweating, like the Tartar Emetic. This is probably owing to its being a much weaker medicine. If a half or quarter of a grain of Emetic Tartar gets into the intestines, it will often excite a considerable evacuation; whereas it requires several grains of Ipecacuanha to produce an equal effect.

Almost all writers on the *Materia Medica* have observed, that powdered Ipecacuanha acts with nearly equal powers, whether a small or large dose is swallowed: which is in all probability owing to this; that as soon as ever a small portion of the powder is dissolved, it occasions nausea and vomiting, and all of it is quickly expelled from the stomach. So that the quantity given is not very material, provided enough is swallowed to excite vomiting. No man,  
however,

however, ought to venture to give an excessive dose, depending upon this general fact; lest the powder should not all be expelled, and serious effects be produced.

The Antimonial powder of the London Dispensary, which is probably the same with the celebrated James's Powder, but certainly the same in its medicinal properties, is the Emetic which I shall next consider.

In this preparation, the antimony is not in a saline state, like the Tartar Emetic, but in that of a calx. Before this medicine can produce any effect upon the stomach, it must be dissolved by its juices.

It is probably this circumstance alone which is the cause of the difference between the action of James's Powder and the Tartar Emetic in the human body.

Antimony is the basis of both these medicines; but the Tartar Emetic, when exhibited, is in a saline and dissolved state, and capable of acting upon the nerves of the stomach as  
soon

foon as it comes in contact with them; whereas James's Powder is in a calcined undissolved state, and cannot excite any action till it is dissolved or digested.

The Tartar Emetic is consequently much more apt to excite vomiting; and James's Powder is more apt to produce purging and sweating.

It has often been tried to produce these effects, by exhibiting very small doses of Tartar Emetic, and repeating them frequently. But it is now pretty generally admitted, that by no management of Tartar Emetic, can it be made to excite sweating and purging without vomiting, with such success as the Antimonial Powder. The slow and gradual solution of this calx lets loose the antimony upon the stomach in a small quantity at a time. A slight nausea is only felt, which is not sufficient to occasion vomiting. The Antimony then passes into the intestines, and part of  
it

it is absorbed, and purging and sweating are produced.

It is a little disputed, whether the Antimonial Powder of the London Dispensary is precisely the same with the celebrated James's Powder. There are persons who affirm that they are different; and that the exact receipt of this medicine is still undiscovered. In confirmation of this, they maintain, that the Antimonial Powder is weaker and less active; that seven grains of James's Powder is as strong as eight grains of the Antimonial Powder. If this is the only difference, it is one of no importance; as it is as easy to swallow eight grains as seven.

Were I to presume to give my own opinion on a matter so nice and difficult to ascertain, I should say that there is some very slight difference in the effects of the James's and the Antimonial Powder; but that difference is in favour of the An-

timonial Powder prepared at Apothecaries Hall.

Whether it is owing to the Antimony's being more thoroughly calcined, or to any other circumstance, I shall not pretend to assert; but it appears to me, that the Antimonial Powder is rather less apt to excite nausea and vomiting, and acts more as a sudorific and purgative, than James's Powder. The difference, however, is certainly exceedingly trifling.

The Antimonial wine is a medicine much in use. Its powers appear to be exactly the same with a solution of Tartar Emetic. It is not very easy to ascertain the exact comparative strength of these medicines; but, as far as I can judge, a grain of Emetic Tartar is nearly equal to a dram of Antimonial wine.

Ipecacuanha and Antimony are considered as so decidedly the best and most  
z manage-



manageable Emetics, that it is hardly necessary to treat of the others.

There are several other medicines, such as the squill, the digitalis, the white and blue vitriols, &c. which are Emetics, and efficacious remedies ; though they are not useful simply from their Emetic quality, but from some other. As Emetics, they are either uncertain or dangerous ; and this is not the place to treat of their other powers.

THE END.





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